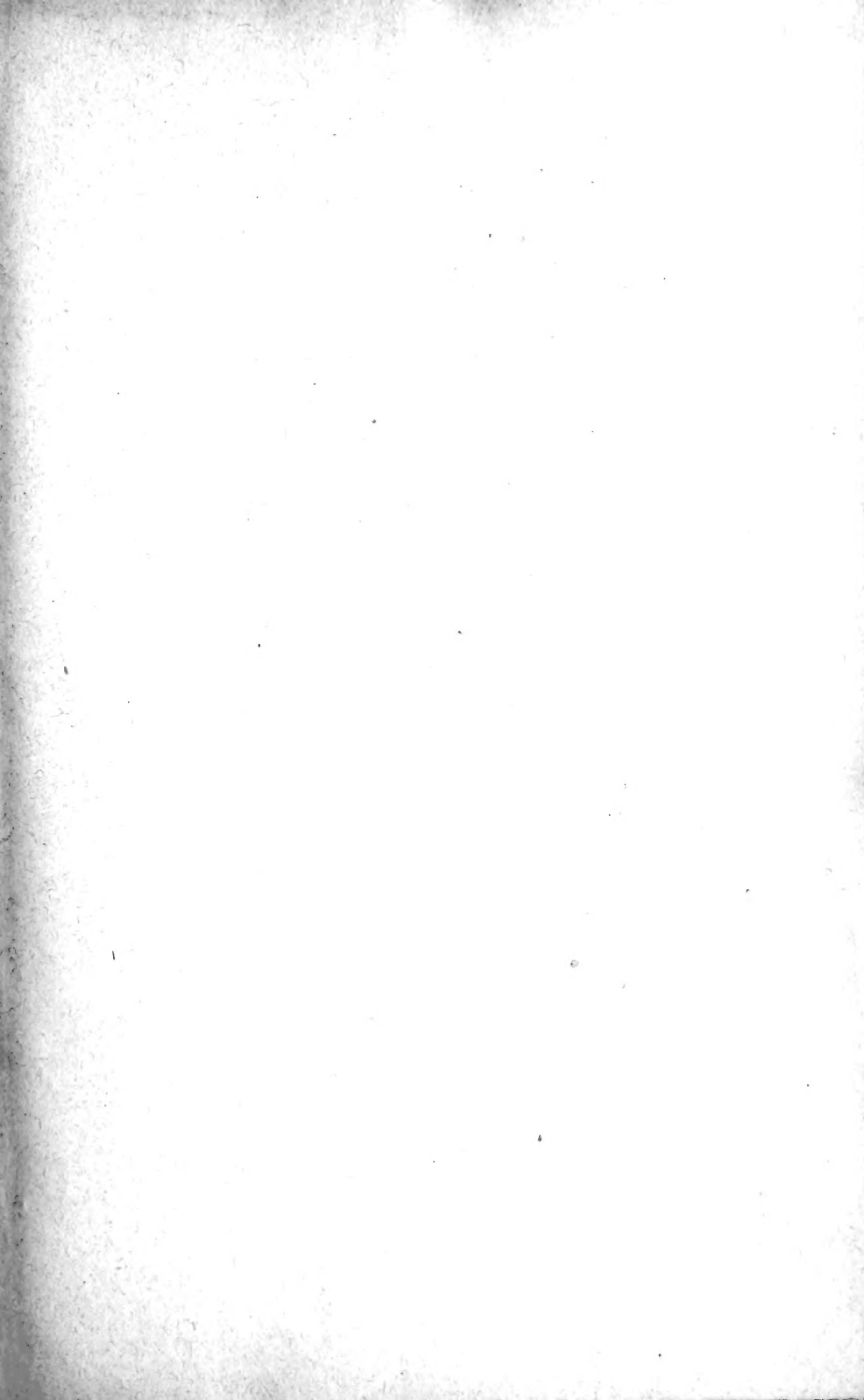


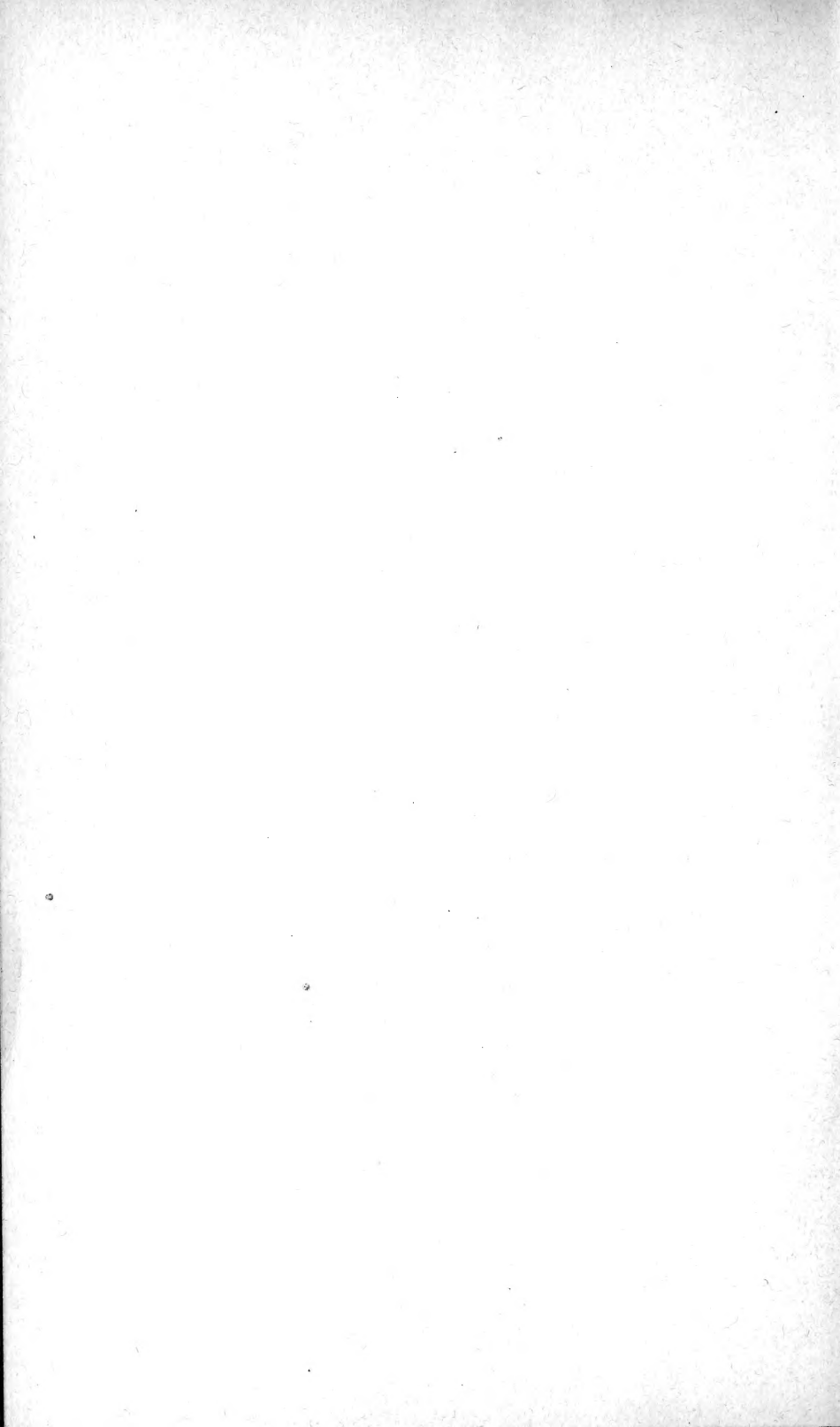
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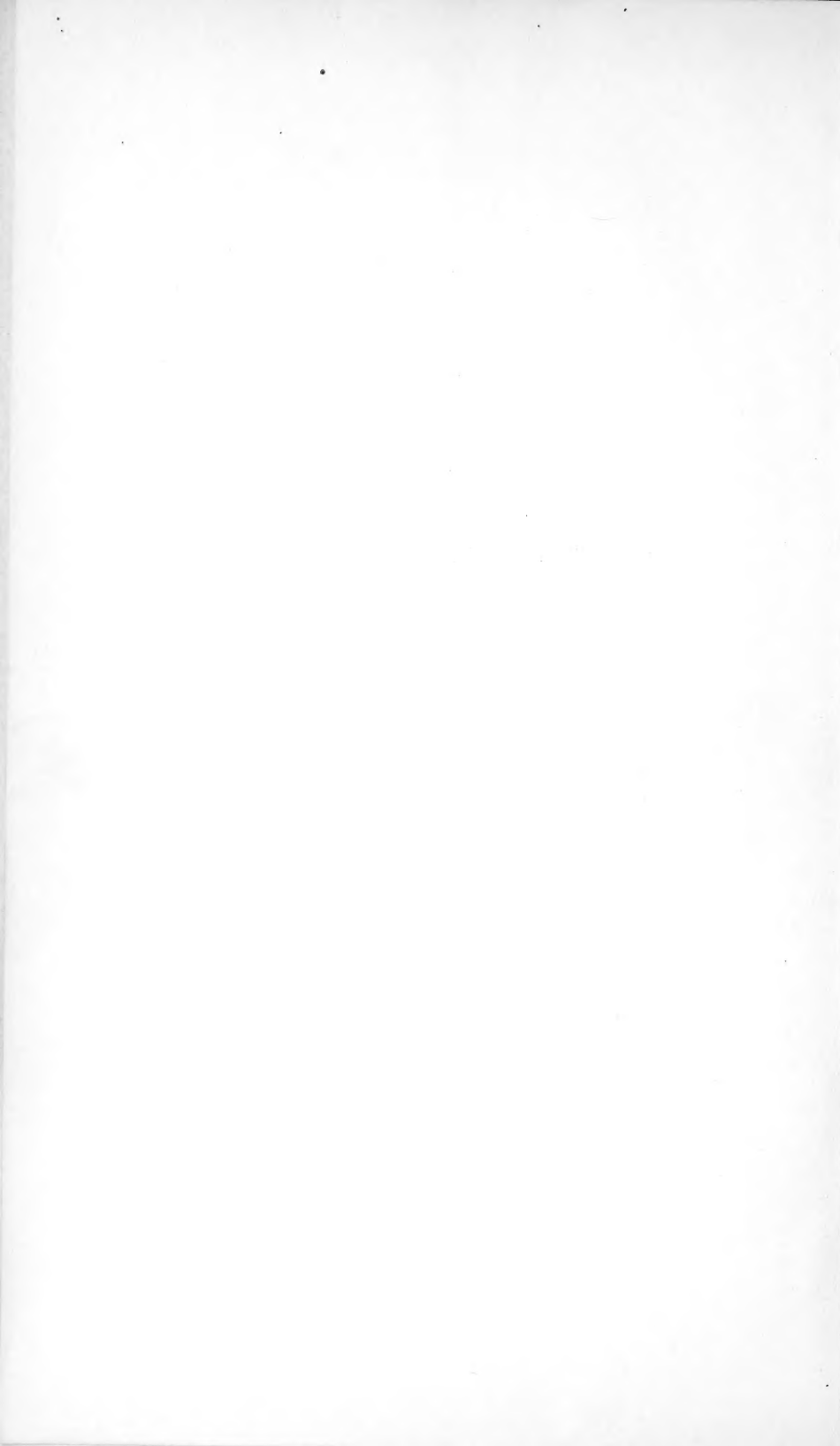
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PROCEEDINGS
OF THE
ROYAL IRISH ACADEMY

VOLUME XXVI



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1906-1907

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ROYAL IRISH ACADEMY

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SECTION A.—MATHEMATICAL, ASTRONOMICAL,
AND PHYSICAL SCIENCE



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CONTENTS

SECTION A.—MATHEMATICAL, ASTRONOMICAL, AND PHYSICAL SCIENCE

HACKETT (FELIX EDWARD), M.A., B.Sc., M.R.I.A. :—	PAGE
The Ionic Theories of Magneto-Optic Rotation,	1
PURSER (FREDERICK), M.A., F.T.C.D., M.R.I.A. :—	
Some Applications of Bessel's Functions to Physics,	25

E R R A T A .

SECTION A.

Page 27, line 3 from bottom, *read*

$$" U = \frac{1}{2} \cos \frac{\pi z}{2b} \tan \left(2 \tan^{-1} e^{-\frac{\pi(\alpha-r)}{2b}} \right) ",$$

,, 31, ,, 8 from bottom, *for* " $\frac{\pi R}{2l} = dx$ " *read* " $\frac{\pi R}{l} = dx$ ".

,, 31, bottom line, *for* " $\int_0^R E \left(\frac{r}{R} \right) dr dv$ ", *read* " $\int_0^R E \left(\frac{r}{R} \right) r dr$ ".

,, 34, line 9 from top, *for* " $\frac{4}{\pi^2} \cdot \frac{\pi^2}{8l^2}$ ", *read* " $\frac{4}{\pi^2} \cdot \frac{\pi^2 l^2}{8}$ ".

,, 39, ,, 10 from top, *read* "The law of distribution of charge will be determined as in problem C".

,, 40, ,, 7 from top, *for* " $x = \frac{\pi R}{h}$ ", *read* " $u = \frac{\pi R}{h}$ ".

,, 40, bottom line, *should read* " $-\frac{4R^2}{h^2} x' \sum_u \frac{u}{(u^2 - x^2)(u^2 - x'^2)}$ ".

,, 44, line 3 from bottom, *for* " $4B\gamma nR' Y_0(nR')n^2 l$ " *read* " $4B\gamma nR Y_0(nR')/n^2 l$ ".

,, 45, lines 2, 4, 6, 7 from top, *for* " $\frac{dv}{dr}$ ", *read* " $\frac{dv}{dz}$ ".

,, 45, line 3 from bottom, *for* " $-4\gamma B \sum \frac{e^{-\frac{1}{2}nB}}{n^2 l}$ " *read* " $-4\gamma B \sum \frac{e^{-\frac{1}{2}nB}}{nl}$ ".

,, 51, ,, 5 from top, *for* " $\frac{U+u}{2l} R$ " *read* " $\frac{U-u}{2l} R$ ".

,, 51, in bottom line prefix "The latter".

,, 60, line 3 from top, *for* " $\frac{\mu xy}{a}$ " *read* " $\frac{\mu ny}{a}$ ".

,, 62, ,, 10 from bottom, *for* " $\frac{a^2}{2} J_0^2(a_m r)$ " *read* " $\frac{a^2}{2} J_0^2(a_m a)$ ".

,, 64, ,, 4 from bottom, *for* " $\frac{\Omega}{2}$ " *read* " Ω ", making corresponding correction throughout to end.

N. Y. ACADEMY
OF SCIENCES

PROCEEDINGS

OF

THE ROYAL IRISH ACADEMY

PAPERS READ BEFORE THE ACADEMY.

I.

THE IONIC THEORIES OF MAGNETO-OPTIC ROTATION.

BY FELIX E. HACKETT, M.A., B.Sc.,

University College, Dublin.

Read APRIL 23. Ordered for Publication APRIL 25. Published JULY 7, 1906.

THE influence of a magnetic field on the transmission of plane-polarised light has always been an important problem in any theory that endeavoured to explain the interaction of light and matter. The earlier attempts to explain the phenomenon are all deficient in that they have no real physical basis; but, with the rise of the theory of electrons, great progress has been made, especially by Drude, who has developed two possible explanations of the phenomenon on what may be called the ionic hypothesis. These two explanations still hold the field, as the existing experimental evidence, and in particular the evidence obtained to test the formulæ for the rotation of the plane of polarisation, has not enabled either to be decisively rejected. The principal criterion to decide between them is this—that the hypothesis which assigns the effect to rotating ions indicates that the magnetic rotation should change sign when crossing an absorption-band, while the second formula, based on the Hall-effect, leads to the conclusion that the rotation should be of the same sign on each side of an absorption-band. The latter condition is satisfied completely in the case of sodium vapour, which has been very completely investigated by Wood.¹ Its behaviour has also been found to satisfy some other

¹ Phil. Mag., Oct., 1905.

deductions of this theory, which is accordingly taken to hold for this particular case, and, possibly, for all gases and vapours. It is not quite certain whether a change of sign in the magnetic rotation has been actually observed; in the case of praseodymium chloride, Wood¹ under great difficulties, obtained indications of such a property. The validity of the hypotheses in other cases has been usually tested by their dispersion formulæ; but as these are equally satisfactory within the range of the spectrum, no verdict can be given. Recently, however, Ingersoll,² extending the range of examination of the rotatory power of carbon disulphide into the infra-red, found that the Hall-effect formula was beginning to give more satisfactory results.

While, therefore, there is a disposition to reject the hypothesis of rotating ions as a general explanation of the phenomenon of magnetic rotation, the experimental evidence on the subject is by no means conclusive. It is proposed to show in this paper that:—

The hypothesis of molecular currents, in conjunction with the average values for the magnetic rotation and index of refraction in diamagnetic substances, leads to values for the radii of the assumed ionic orbits and magnetic susceptibility altogether at variance with the actual or possible values of these magnitudes, so that this hypothesis must be rejected in the case of diamagnetic substances in favour of the hypothesis of the Hall-effect, which leads to a normal value for the ratio $\frac{e}{m}$ of the electron, and so supports the view taken that the Hall-effect is the true explanation of magnetic rotation in diamagnetic substances.

The leading principle in the "ionic theory" is the explanation of the interaction of light and matter by means of charged particles, or ions, anchored to fixed positions in space, which can be disturbed from their position of equilibrium in every direction, and with a restoring force after displacement proportional to the displacement, but independent of its direction. Each ion has its own period of vibration, and will absorb vibrations of that period. From these assumptions formulæ can be deduced, expressing the optical properties of matter in terms of the period, mass, charge, and number of these ions per unit volume. It is, evidently, the disturbance caused by the external magnetic field in the motion of the ions, which is the origin of the magneto-optic rotation. As stated above, Drude has considered this disturbance from

¹ Phil. Mag., May, 1905.

² *Ibid.*, Jan., 1906.

two possible points of view, and thus arrived at two distinct expressions for the rotation. The hypothesis which assigns the effect entirely to rotating ions will be examined first.

The Hypothesis of Rotating Ions.

The effect of a magnetic field on any substance may be expressed by saying that the magnetic field induces molecular currents in the case of diamagnetism, or changes the orientation of molecular currents already existing in the case of paramagnetism. In terms of the ionic theory, the molecular currents are due to ions describing closed circuits. These circuits can all be taken, as will be shown later, to be in planes perpendicular to the magnetic field. The current due to an ion of charge e describing a circuit of area q in time τ is e/τ , and the circuit acts as a magnet of moment qe/τ . The intensity of magnetisation is nqe/τ , where n is the total number of such circuits per unit volume. The sign of the moment of the circuit depends on the sign of the charge and the direction of rotation. This can be expressed by making the proper conventions connecting the signs of e and τ . The flux of magnetic force h per unit area due to all such circuits is given by the equation

$$h = 4\pi \Sigma I = 4\pi \Sigma \frac{neq}{\tau}.$$

Each circuit may be regarded as indeformable, and vibrates under the action of light with the same velocity as the ion would possess if its motion were due solely to the action of light. This motion of the magnetic field due to the ions causes an additional term to be added to the rate of change in the magnetic induction in the equations of the electro-magnetic field. By solving these equations, Drude gets the rotation for the simple case of plane-polarised light travelling in the direction of the magnetic field. His expression for the rotation is expressed below in electromagnetic units, and in a more convenient notation for the purposes of the present paper. The manner in which the transformation is effected is given in detail in a note at the end of the paper. When the necessary changes have been made, it is found the magnetic rotation can be expressed in the form¹

$$\delta = \frac{2\pi^2}{\lambda^2} cvnz, \quad (1)$$

where

$$n^2 = 1 + \sum \frac{\phi_s}{1 - \frac{\lambda_s^2}{\lambda^2}}$$

$$e^2\nu = \sum \frac{\phi_s}{1 - \frac{\lambda_s^2}{\lambda^2}} \frac{q_s}{\tau_s}$$

n = the index of refraction,

λ_s = wave-length of ionic vibration,

λ = wave-length of light vibration,

c = velocity of light 3×10^{10} cm. per sec.

q_s = area of the ionic circuit,

τ_s = period of the ionic circuit.

It may be permitted here to briefly recall the physical meaning of the expressions for n and $e^2\nu$. The summation of terms extends over all the absorption-bands. The constant ϕ_s is characteristic of the ions of the absorption-band, depending on their number, mass, charge, and period. It is easily seen that it is equal to the contribution of the ions of the absorption-band to the dielectric constant by making $\lambda = \infty$. As is well known, there are a few substances for which it is only necessary to take account of the ions in one ultra-violet absorption-band. The rest of the absorption-bands lie so far away on each side of the visible spectrum that their wave-length is either very large or very small compared with the wave-length of light: therefore $\frac{\lambda_s^2}{\lambda^2} = 0$. For such terms in the ultra-violet $\frac{\lambda_s^2}{\lambda^2} = 0$, and for the infra-red terms $\frac{\lambda^2}{\lambda_s^2} = 0$.

In this case

$$n^2 = 1 + \sum \phi_v + \frac{\phi_1}{1 - \frac{\lambda_1^2}{\lambda^2}} = 1 + \sum \phi_v + \phi_1 + \frac{\phi_1 \lambda_1^2}{\lambda^2 - \lambda_1^2} = A + \frac{B_1}{\lambda^2 - \lambda_1^2}, \quad (2)$$

$$e^2\nu = \sum \phi_v \frac{q_v}{\tau_v} + \frac{\phi_1}{1 - \frac{\lambda_1^2}{\lambda^2}} \frac{q_1}{\tau_1} = C + \frac{D}{1 - \frac{\lambda_1^2}{\lambda^2}}, \quad (3)$$

we get

$$\delta = \frac{2\pi^2}{\lambda^2} vncz = \frac{2\pi^2}{\lambda^2} \left[C + \frac{D}{1 - \frac{\lambda_1^2}{\lambda^2}} \right] \frac{n}{c} z = n \left[\frac{a'}{\lambda^2} + \frac{b'}{\lambda^2 - \lambda_1^2} \right], \quad (4)$$

and from these transformed equations (2) and (3) of Drude, we have the following equation, which is the basis of the present paper:—

$$\frac{q}{\tau} = \frac{D\lambda_1^2}{B_1}. \quad (5)$$

Drude tested this formula (4) for carbon disulphide and creosote, and found very satisfactory agreement with experiment, both in the case of the index of refraction and the magnetic rotation. To save the trouble of reference, the tables he gives have been reproduced below:—

Bisulphide of Carbon.

$$\begin{array}{ll} \lambda_1 = 0.212\mu & \lambda_1^2 = 0.0450 \\ A = 2.516 & B = 0.0433 \\ a' = -0.0136 & b' = +0.1530 \end{array}$$

Spectr. Line.	n calc.	n obs.	δ calc.	δ obs.
<i>A</i>	1.6115	1.6118	..	..
<i>B</i>	1.6179	1.6181	..	..
<i>C</i>	1.6210	1.6214	0.592	0.592
<i>D</i>	1.6307	1.6308	0.762	0.760
<i>E</i>	1.6439	1.6438	0.999	1.000
<i>F</i>	1.6560	1.6555	1.232	1.234
<i>G</i>	1.6805	1.6800	1.704	1.704
<i>H</i>	1.7033	1.7032	..	..

Creosote.

$$\begin{array}{ll} \lambda_1 = 0.1845\mu & \lambda_1^2 = 0.0340, \\ A = 2.2948 & B_1 = 0.0227, \\ a' = -0.1799 & b' = +0.3140. \end{array}$$

Spectr. Line.	n calc.	n obs.	δ calc.	δ obs.
<i>B</i>	1.5319	1.5319	0.515	..
<i>C</i>	1.5336	1.5335	0.573	0.573
<i>D</i>	1.5386	1.5383	0.745	0.758
<i>E</i>	1.5454	1.5452	0.990	1.000
<i>F</i>	1.5515	1.5515	1.226	1.241
<i>G</i>	1.5636	1.5639	1.723	1.723
<i>H</i>	1.5744	1.5744	2.206	..

These constants given by Drude, if they are reduced to the proper units, enable us to calculate q/τ by means of equation (5). The calculation possesses no special interest, and is presented separately in NOTE B. The calculation shows that $\frac{q}{\tau H}$ is constant, which follows from the fact that Verdet's constant is independent of the magnetic field. It is assumed in the foregoing that all the ions in any one absorption-band describe circuits of the same area and period; since these ions are all alike in their properties, this must be true, as they should behave similarly in the magnetic field.

From Drude's constants we get for the ions in the ultra-violet absorption-band of carbon disulphide and creosote the following values

for $\frac{q}{\tau H}$:—

$$\frac{q_1}{\tau_1 H} = 3.87 \times 10^{-5} \text{ for carbon disulphide,}$$

$$\frac{q_1}{\tau_1 H} = 4.28 \times 10^{-5} \text{ for creosote.}$$

It would thus seem that we could determine the area and size of these ionic circuits for a given magnetic field when the value of τ is known, and thus get an estimate of the internal motions in the molecule.

The Period of the Ionic Circuits.

In deducing this result, no conception has yet been formed regarding the mass or period of the ion. It would seem natural at first to

consider that the period is the same as the corresponding light vibration. This is not the case. Assuming that some mode of motion of the ion persists, a close examination shows that it is only the disturbance introduced into the path of the ion by the external magnetic field which produces magneto-optic rotation, and that the influence of this disturbance may be represented by the ion describing an orbit with angular velocity $\frac{eH}{2m}$ in a plane normal to H in the customary notation.

The average magnetic field for a time t , during which the ion describes any path, is equal to the magnetic field due to a current of strength $\frac{e}{t}$ in the path, whether this path be closed or not, provided the ion is not moving with a speed approaching that of light. If an ion of charge e describe an orbit in the periodic time T , the magnetic field of the ion can be replaced by the field due to a current of strength $\frac{e}{T}$ in the same orbit, or by a magnetic shell of the same area and strength, which can be resolved into three component magnetic shells or current circuits, q_x, q_y, q_z , in the rectangular planes, each circuit having a current strength $\frac{e}{T}$ where q_x, q_y, q_z are the projected paths of the ion on these planes. The distortion of the path by the external magnetic field, as Larmor showed, can be represented by a rotation of the axes round the magnetic force with an angular velocity $\frac{eH}{2m}$, while the ion describes its original path with reference to the moving axes. It simplifies matters to take the axis of z along the direction of the external field, and, if this be done, it is seen that the magnetic field of the ion is now equivalent to a rotation of the system q_x, q_y, q_z with the axes, with an increased current in the circuit q_x . The rotation of the axes has a period very great in comparison with the natural periods of the ions, so that the actual path of an ion is but slightly altered during the period T ; the average magnetic force during this time will then be given by the same system as before, the components q_x, q_y, q_z , each with current strength $\frac{e}{T}$ in the instantaneous position of the rectangular planes. This is only a first approximation, and the influence of the change in the path has yet to be allowed for. The actual projections of the path during the

period are not now q_x, q_y, q_z , but slight distortions of them, which, in the case of q_x, q_y , since the rotation is about z , are equivalent to introducing small components at right angles, causing a rotation of their magnetic field with the planes of reference, that is, q_x and q_y may be conceived to rotate with these planes. The circuit q_z also rotates, but the distortion due to this cause does not change the direction of the magnetic force, but only its magnitude. The orbit q_z is now described with angular velocity $\frac{2\pi}{T} - \frac{eH}{2m}$, and the magnetic field due to this orbit can be replaced by that due to the circuit q_z , with current strength $\frac{e}{T}$ and an additional current $\frac{e}{\tau}$ where $\frac{2\pi}{\tau} = \frac{eH}{2m}$, which may be considered as flowing in a separate circuit denoted by q_z' .

To show that it is only the class of components q_z' which need be considered in general, it is necessary to examine the state of things in the absence of an external magnetic field. Assuming that the ions are ever in a state of motion, then their magnetic field can be grouped into the three components which, summing over all the ions of any given class present, give resultant sums along the axes $(h_s)_x, (h_s)_y, (h_s)_z$ for the ions of class (s) . These three components are equal and must be zero, since otherwise, in the transmission of light close to the period of these ions, the influence would be predominant, and, according to theory, there should be a marked rotation of plane-polarised light near an absorption-band.

As this is not so in general,

$$[h_s]_x = [h_s]_y = [h_s]_z = 0.$$

In the presence of an external magnetic field, *these components cannot produce any rotation*, since they are unchanged when resolved along the rotating system of axes, and vanish by reason of the above condition. This argument holds evidently only for diamagnetic substances, which are not optically active; and, in passing, it may be noted, suggests a possible mode of attacking this last property.

The magnetic rotation must then be caused by the fourth class of components q_z' , and we may ignore completely the presence of the other components. The direction of rotation in q_z' is left-handed with reference to the external field, and produces a magnetic force opposed to it. These circuits are obviously the equivalent of the molecular

currents invoked to explain diamagnetism, and, since the sum of the normal components h_x, h_y, h_z of each kind of ion is null, with or without the external field, it is obvious, in calculating the susceptibility, we may also ignore them. This result also follows, if we make the assumption that the molecule is non-magnetic, and that all the ions describing circuits are alike [*i.e.*, electrons], and consequently under the influence of an external field the rotating axes for each circuit have the same angular velocity. In this case the total sum of the components along the three axes $\Sigma q_x, \Sigma q_y, \Sigma q_z$ vanish when the axes are fixed, and when they are rotating, since each molecule is non-magnetic, and consequently the susceptibility depends on the circuits q_z' . In the expressions for magnetic rotation and magnetic susceptibility, then we may ignore completely the normal components of the magnetic field of the ion h_x, h_y, h_z , and regard the circuit q_z' with a current $\frac{e}{\tau}$ as the only circuit present.

The ion then may be considered as simply describing, in a periodic time $\tau = \frac{2\pi}{\frac{eH}{2m}}$, the circuit q_z' , which is the projection of its actual path

on a plane normal to the magnetic field. We have then for the magnetic susceptibility, if I is the magnetic moment per unit volume and q the area of the ionic circuit,

$$4\pi kH = 4\pi \Sigma I = 4\pi \Sigma \frac{nqe}{\tau} = 4\pi \Sigma \frac{nqe^2 H}{4\pi m},$$

$$k = \Sigma \frac{nqe^2}{4\pi m} = \Sigma \frac{nqe}{\tau}. \quad (6)$$

A different mode of treatment of the question given by Langevin for the magnetic susceptibility of diamagnetic substances leads to a similar expression for k . The above course of reasoning shows that the same simplified circuit, which occurs in the expression for k , is the only efficient cause in producing the rotation which may be due to motion of the ions in orbits. Therefore we cannot take the period in the expression $\frac{q}{\tau H}$ as the natural period; but we must take the modified period of the simplified circuit, and substitute

$$\tau = \frac{2\pi}{\frac{eH}{2m}}.$$

The Area of the Ionic Circuits.

The ionic circuits can, on an average, be regarded as circular. We have then $q = \pi r^2$, where r is the radius of the circuit: and inserting the value for the periodic time deduced above, we get

$$\frac{q}{\tau H} = \frac{\pi r^2 \frac{eH}{2m}}{H 2\pi} = \frac{r^2 e}{4 m}.$$

For the ions in the ultra-violet absorption-bands of carbon disulphide and creosote, the following values were obtained for the radii of the ionic circuits in cm.

	$\frac{q}{\tau H} \times 10^5$	$\frac{e}{m}$	r
Carbon disulphide, .	3.9	1.8×10^7	2.9×10^{-6}
Creosote,	4.3	1.8×10^7	3.1×10^{-6}

The kinetic theory of gases gives us as an upper limit for the radius of the sphere of influence the value 2×10^{-8} cm.

The values for the radius of the ionic orbits are then 100 times the molecular diameter, and their area 10,000 times the molecular section. This is of course an impossible result, and it can also be shown that a result of similar character holds good in general for diamagnetic substances, though satisfactory dispersion-formulæ have only been obtained in a few cases.

It will now be shown that $\frac{q}{\tau H}$ is, in general, of the same order as has been already found for carbon disulphide and creosote.

We have from (1)

$$\delta = \frac{2\pi^2}{\lambda^2} e m z,$$

$$n^2 = 1 + \sum \frac{\phi_s}{1 - \frac{\lambda_s^2}{\lambda^2}}$$

$$c^2\nu = \sum \frac{\phi_s \frac{q_s}{\tau}}{1 - \frac{\lambda_s^2}{\lambda^2}}$$

We can evidently write $c^2\nu = \frac{q}{\tau}(n^2 - 1)$ where $\frac{q}{\tau}$ is of the same order of magnitude as the highest values of $\frac{q_s}{\tau_s}$ occurring in $c^2\nu$.

Writing = ord. as an abbreviation for "is of the same order of magnitude as"

$$\delta = \text{ord.} \frac{2\pi^2 n}{\lambda^2 c} \cdot (n^2 - 1) \frac{q}{\tau} z.$$

Expressing Verdet's constant in radians where A_m is its value in minutes

$$\delta = \frac{A_m}{3437.75} Hz,$$

$$\frac{A_m}{3437.75} = \text{ord.} \frac{2\pi^2 n}{\lambda^2 c} (n^2 - 1) \frac{q}{\tau H},$$

$$\frac{q}{\tau H} = \text{ord.} \frac{c\lambda^2 A_m}{2\pi^2 n (n^2 - 1) 3437.75}.$$

Taking the value of Verdet's constant for yellow line of sodium, we find that the average value of $\frac{A_m}{n(n^2 - 1)}$ is about 1×10^{-2} for the following substances:—methyl alcohol, ethyl alcohol, acetone, water, benzene, carbon disulphide, quartz, rock-salt, sylvine, borax, selenium, blende, fluorspar, diamond.

For these substances then

$$\frac{q}{\tau H} = \text{ord.} 1.6 \times 10^{-5},$$

which is of the same order as the values got in the more precise calculation for carbon disulphide and creosote. Using this approximation to estimate the radius of the ionic orbits, we have

$$\frac{q}{\tau H} = \frac{r^2 e}{4 m} = 1.6 \times 10^{-5},$$

$$r = \text{ord.} 1.8 \times 10^{-6}.$$

It is obvious that there is something unsound in the assumptions which lead to such results. The explanation that the ions are not describing circuits or are not influenced by the magnetic field in the manner conceived would by no means be a satisfactory solution of the question. It is more feasible to regard the discrepancy as arising in the application of the theory to the experimental facts. If the ions were describing circuits of molecular size, then $\frac{q}{\tau H}$ would have 1/10000 of the values given above, and consequently such a system could not produce more than 1/1000 of the observed rotation. Another way of stating the case is that the magnetic field produced by the rotating ions would require to be about 10,000 times greater than it is to produce the actual rotation. This suggests that, if the magnetic susceptibility were calculated by means of the data obtained above concerning the ionic circuits, we should obtain also impossible values. This additional form of the argument is given here, as it utilises directly the calculated values of $\frac{q}{\tau H}$, and thus avoids the question of the periodic time.

Magnetic Rotation and Magnetic Susceptibility.

If we make the usual hypothesis that the ions in diamagnetic substances on the application of magnetic force are set rotating in a plane normal to the field in such a direction that the force due to the ion, whether positive or negative, is opposed to the field, all terms in the expression for the magnetic susceptibility can then be taken positive. We have the following expression for k from (6)

$$k = \sum \frac{e_p n_p q_p}{\tau_p H},$$

where

n = number of ions per unit volume,

e = charge on the ions.

It simplifies the argument if we refer these quantities to the molecule and the molecular constants, writing

β_p = number of ions of class (p) per molecule,

N = number of molecules per molecular weight in grammes,

V = volume of the molecular weight in grammes,

$\frac{\beta_p N}{V}$ = number of ions per unit volume,

ϵ = charge carried by the silver ion in electrolysis,

s = number of such charges carried by the ion,

e_s = charge on the ion,

$N\epsilon$ = 9654 electro-magnetic units. Since this quantity of electricity deposits 108 gms. of silver or N atoms of silver carrying charge ϵ .

Making these substitutions, we get

$$k = \sum \frac{n_p e_p q_p}{\tau_p H} = \frac{N\epsilon}{V} \sum s_p \beta_p \frac{q_p}{\tau_p H}.$$

Since all terms in k are positive, k is certainly greater than any one term; and since $s\beta$ is greater than unity, provided we take the proper molecular weight, we can immediately set down a lower limit for the susceptibility in the case of carbon disulphide and creosote, and in the more general case, the order of this lower limit, based on deductions made from magnetic rotation, which will test the correctness of the application of the hypothesis of rotating ions. The actual values of the susceptibility are compared below with the lower limit calculated: in this way we should have—

$$kV = 9654 \sum \frac{s\beta q}{\tau H} > 9654 \frac{q}{\tau H}$$

Substance.	$\frac{q}{\tau H}$	$9654 \frac{q}{\tau H}$	kV obs.
Carbon disulphide,	3.9×10^{-5}	37×10^{-2}	72×10^{-6}
Creosote,	4.3×10^{-5}	41×10^{-2}	84×10^{-6}
Diamagnetic substances,	1.6×10^{-5}	15×10^{-2}	100×10^{-6}

These numbers show that the lowest values for the susceptibility which could exist on the basis of the present theory of magnetic rotation is certainly 10,000 times too great. There is no necessity to consider whether the actual molecule is represented by the chemical formula or a multiple of it, and so cause β , the number of ions per chemical formula, to be less than unity. The difference is far too great to be affected by considerations of this nature. Chemical

knowledge is not quite definite on the point; but it may be taken that the multiple at the outside could not exceed 10, and in most cases the chemical formula represents the molecule. The meaning of this result is easily seen. In order that the magnetic field due to the ions should produce the rotation observed, it should be 10,000 times greater than it actually is; or *the rotation which is produced by the magnetic field of the ions must be at most of the order of one-thousandth of what is actually observed.*

The argument can then be summarised as follows:—

1. Diamagnetism and paramagnetism are explained on the hypothesis of molecular currents caused by rotating ions.

2. The electromagnetic equations, expressing the influence of the external magnetic field, and these ionic circuits on the transmission of light through a substance, show that plane-polarised light would suffer rotation due to the rotating ions. It is then tentatively assumed that all the actual rotation is due to this cause.

3. The formula, showing how the rotation varies with wavelength, agrees very satisfactorily with observation.

4. But it is shown in this paper that from this formula can be deduced the value of $\frac{q}{\tau H}$, where H is the external field, and q is the area, and τ the periodic time of the circuits in the ultra-violet absorption-band of carbon disulphide and creosote. It is also shown that $\frac{q}{\tau H}$ must have a value of the same order in all diamagnetic substances in general, from the known value for Verdet's Constant of magnetic rotation, and that this calculated value of $\frac{q}{\tau H}$ leads to absurd results.

5. It is shown that the periodic time of the ionic circuits must be taken as $\tau = 2\pi \sqrt{\frac{eH}{2m}}$, as indicated by Langevin, which enables q to be evaluated. The resulting value of the ionic orbit is found to be about 100 times the molecular radius.

6. It is also shown that this value of $\frac{q}{\tau H}$ would require the magnetic susceptibility to be 10,000 times greater than its observed value.

7. From the expression (6) given for the magnetic susceptibility, it is easily seen that ions describing orbits of molecular size, or even much smaller than this, would completely account for the observed

values of the susceptibility. The results stated in (5) and (6) then show that such rotating ions could not produce one-thousandth part of the observed rotation. The tentative assumption that all the magnetic rotation in diamagnetic bodies is due to rotating ions must therefore be dropped. It is well known that the theory did not represent the facts for sodium vapour. But this investigation goes still further; it is now seen that *though the presence of rotating ions does cause magnetic rotation, yet the hypothesis of rotating ions must be abandoned as the cause of the effect in diamagnetic substances, since it only explains a negligible part of the actual magnetic rotation.*

The Hypothesis of the Hall-Effect.

It is more than probable then that the Hall-effect is the true cause of the magnetic rotation; and it will now be shown that an analysis similar to the above justifies this view.

In the second explanation of magnetic rotation, this phenomenon is assigned to the distortion of the paths of the ions in the magnetic field due to the electromagnetic force acting on a charged body at right angles to its direction of motion in the magnetic field. This distortion of the path is expressed in Maxwell's equations, by additional terms in the expression for the dielectric current. These terms give the rotation of plane-polarised light travelling in the direction of the field. The form given below is taken from Drude, expressed in the uniform notation of this paper. The transformation is given in note A. The magnetic rotation is found to be—

$$\delta = \frac{-\nu H z}{2n\lambda^2 c}, \quad (7)$$

where

$$n^2 = 1 + \sum \frac{\phi_s}{1 - \frac{\lambda_s^2}{\lambda^2}},$$

$$\nu = \sum \left(\frac{\phi_s}{1 - \frac{\lambda_s^2}{\lambda^2}} \right)^2 \frac{e_s \lambda_s^2}{m_s},$$

n = index of refraction,

c = velocity of light in cm.,

e = charge on the ion in electro-magnetic units,

m = mass of the ion,
 λ_1 = wave-length of ionic vibration,
 λ = wave-length of light vibration.

It was shown in the earlier part of this paper that, in many cases, it was only necessary to take account of the ions in one ultra-violet absorption-band. For the rest of the ultra-violet terms $\frac{\lambda_v^2}{\lambda^2} = 0$, and for the infra-red terms $\frac{\lambda_r^2}{\lambda^2}$. In this case

$$n^2 = 1 + \Sigma \phi_v + \frac{\phi_1}{1 - \frac{\lambda_1^2}{\lambda^2}} = 1 + \Sigma \phi_v + \frac{\phi_1 \lambda_1^2}{\lambda^2 - \lambda_1^2} = A + \frac{B_1}{\lambda^2 - \lambda_1^2},$$

$$\nu = \Sigma \phi_v \frac{e_v \lambda_v^2}{m_v} + \frac{\phi_1}{\left(1 - \frac{\lambda_1^2}{\lambda^2}\right)^2} \frac{e_1 \lambda_1^2}{m_1} = C' + \frac{D'}{\left(1 - \frac{\lambda_1^2}{\lambda^2}\right)^2},$$

$$B_1 = \phi_1 \lambda_1^2. \quad D' = \phi_1 \frac{\lambda_1^2}{m_1}. \quad (8)$$

Hence we have

$$\delta = \frac{1}{2nc} \left[\frac{C'}{\lambda^2} + \frac{D'\lambda^2}{(\lambda^2 - \lambda_1^2)^2} \right] Hz = \frac{1}{n} \left[\frac{a''}{\lambda^2} + \frac{b''\lambda^2}{(\lambda^2 - \lambda_1^2)^2} \right], \quad (9)$$

and

$$\frac{e_1}{m_1} = \frac{D'}{B}. \quad (10)$$

Drude gives the following tables, which show how the formula (9) agrees with observation:—

BISULPHIDE OF CARBON.

$$\lambda_1^2 = 0.0450, \quad a'' = +0.1167, \quad b'' = +0.2379.$$

Spectr. Line.	δ calc.	δ obs.
<i>C</i>	0.592	0.592
<i>D</i>	0.760	0.760
<i>E</i>	0.996	1.000
<i>F</i>	1.225	1.234
<i>G</i>	1.704	1.704

CREOSOTE.

$$\lambda_1^2 = 0.0340, \quad a'' = -0.070, \quad b'' = +0.380.$$

Spectr. Line.	δ calc.	δ obs.
<i>C</i>	0.573	0.573
<i>D</i>	0.744	0.758
<i>E</i>	0.987	1.000
<i>F</i>	1.222	1.241
<i>G</i>	1.723	1.723

From the constant b'' obtained by Drude, it is possible to calculate D' . Therefore we can deduce the value of $\frac{e_1}{m_1}$ for the ions of the ultra-violet absorption-band in carbon disulphide and creosote. The calculation is given in NOTE B. We get

$$\frac{e_1}{m_1} = .53 \times 10^7 \text{ for carbon disulphide,}$$

$$\frac{e_1}{m_1} = .77 \times 10^7 \text{ for creosote.}$$

The theory of the Hall-effect leads to a proper value of $\frac{e}{m}$ in the case of carbon disulphide and creosote. It is possible by the same kind of approximation as before to show that in general the value of $\frac{e}{m}$ deduced from the magnetic rotation on this theory is of the proper order. The dispersion formula in general has to take account of absorption-bands in the infra-red also; and if κ be the dielectric constant, we have the following relations:—

$$\begin{aligned} n^2 &= 1 + \sum \frac{\phi_3}{1 - \frac{\lambda_1^2}{\lambda^2}} = A + \frac{\phi_1 \lambda_1^2}{\lambda^2 - \lambda_1^2} + \frac{\phi_2 \lambda_2^2}{\lambda^2 - \lambda_2^2} + \frac{\phi_3 \lambda_3^3}{\lambda^2 - \lambda_3^2} \\ &= A + \frac{B_1}{\lambda^2 - \lambda_1^2} + \frac{B_2}{\lambda^2 - \lambda_2^2} + \frac{B_3}{\lambda^2 + \lambda_3^2}, \end{aligned}$$

$\kappa - A = \Sigma\phi_r$ of the infra-red terms besides B_2, B_3 ,

$A - \frac{B_1}{\lambda_1^2} - \frac{B_2}{\lambda_2^2} - \frac{B_3}{\lambda_3^2} - 1 = \Sigma\phi_c$ of the ultra-violet terms other than B_1 ,

$$\phi_1 = B_1\lambda_1^2.$$

The values of ϕ_s for the different kinds of ions whose periods lie near the spectrum periods are almost identical. From a table of dispersion constants the following averages were obtained. For the ultra-violet periods $\phi_1 = 1$. For the infra-red periods $\phi_2 = 2.3$. The values of $\Sigma\phi_c$ and $\Sigma\phi_r$ calculated from the table show that ϕ for the other ions present is small. The average value of $\Sigma\phi_c$ and $\Sigma\phi_r$ is about .4. For the present approximation, it is evident that the values of ϕ for any absorption-band do not greatly differ. We have

$$n^2 - 1 = \sum \frac{\phi_s}{1 - \frac{\lambda_s^2}{\lambda^2}},$$

$$v = \sum \frac{\phi_s}{\left(1 - \frac{\lambda_s^2}{\lambda^2}\right)^2} \frac{\epsilon_s \lambda_s^2}{m_s}$$

We can therefore write

$$v = \frac{\bar{\epsilon} \bar{\lambda}^2}{m} (n^2 - 1)$$

where $\frac{\bar{\epsilon} \bar{\lambda}^2}{m}$ is of the same order of magnitude as the highest values

of $\frac{\epsilon \lambda^2}{m_s}$ occurring in v , since it has been shown above that in this approximation the coefficients are practically equal. Using the same notation as before and equating the expression for δ to the usual expression with Verdet's constant expressed in minutes, we have

$$\delta = \frac{v H z}{2n\lambda^2 c} = \text{ord. } H z \frac{(n^2 - 1)}{2n\lambda^2 c} \cdot \frac{\bar{\epsilon} \bar{\lambda}^2}{m} = \frac{A_m}{3437.75} \cdot H z,$$

$$\frac{\bar{\epsilon} \bar{\lambda}^2}{m} = \text{ord. } \frac{2 \cdot \lambda^2 c \cdot n}{3437.75} \cdot \frac{A_m}{n^2 - 1}.$$

Taking A_m for the yellow line of sodium, we find the average value of $\frac{nA_m}{n^2 - 1}$ is .038 for the same list of substances as before.

Inserting the value of λ for this wave-length, regarding λ^2 and $\bar{\lambda}^2$ as expressed in 10^{-4} cm.,

$$\frac{\bar{e} \bar{\lambda}^2}{m} = \text{ord. } 2.3 \times 10^5.$$

In order to find what approximation this gives for an ultra-violet absorption-band, which in the case of carbon disulphide and creosote is seen to be due to electrons, we take .019 the average value of the wave-length of the ultra-violet absorption-bands in the table of dispersion constants, as the value of $\bar{\lambda}^2$ in units of 10^{-4} cm.

We get then

$$\frac{\bar{e}}{m} = \text{ord. } \frac{2.3 \times 10^5}{1.9 \times 10^{-2}} = \text{ord. } 1.2 \times 10^7.$$

The experimental values of $\frac{e}{m}$ lie between 1.86×10^7 and $.64 \times 10^7$; and the preceding calculation from magnetic rotation has given the values:—

	Carbon Disulphide.	Creosote.	Diamagnetic Substances.
$\frac{e}{m}$	$.53 \times 10^7$	$.77 \times 10^7$	order 10^7

These results show that the rotation observed has the magnitude which would arise from the influence of the Hall-effect on the motion of electrons. It is concluded, therefore, that the theory based on the Hall-effect supplies a satisfactory explanation of the phenomenon of magneto-optic rotation, and must be accepted in preference to the theory of rotating ions which only accounts for a negligible part of the rotation, unless impossible values are assigned to the radii of the ionic orbits.

NOTE A.

Transformation of Drude's Expressions for Magnetic Rotation.¹

I.

Drude writes for the rotation on the hypothesis of rotating ions

$$\delta = \frac{v' \sqrt{\epsilon'}}{2c^2 \tau^2} z, \quad [\text{p. 428.}]$$

where

$$\epsilon' = 1 + \sum \frac{n_s \theta_s}{1 - \frac{b_s}{\tau_s^2}}, \quad [\text{p. 425.}]$$

$$cv' = \sum \frac{n_s \theta_s}{1 - \frac{b_s}{\tau_s^2}} \frac{q_s}{T_s}, \quad [\text{p. 425.}]$$

$$\frac{b}{\tau^2} = \frac{1}{\tau^2} \frac{m_s \theta_s}{4\pi e_s^{1/2}} = \frac{\tau_s^2}{\tau^2}, \quad [\text{p. 424.}]$$

- T_s = period of ion in circuit q ,
 n_s = number of ions per unit volume,
 $2\pi\tau$ = period of light-vibration,
 $2\pi\tau_s$ = period of ionic vibration,
 c = velocity of light,
 ϵ' = dielectric constant.

Transformation

Write λ = wave-length of light-vibration.

λ_s = wave-length of ionic vibration,

n = index of refraction,

$$\phi_s = n_s \theta_s,$$

$$\frac{b_s}{\tau_s^2} = \frac{\tau_s^2}{\tau^2} = \frac{\lambda_s^2}{\lambda^2}.$$

These substitutions give

$$\delta = \frac{2\pi^2}{\lambda^2} cvnz,$$

¹ Drude's "Theory of Optics"—Longmans.

where

$$n^2 = \epsilon' = 1 + \sum \frac{\phi_s}{1 - \frac{\lambda_s^2}{\lambda^2}},$$

$$c^2\nu = c\nu' = \sum \frac{\phi_s}{1 - \frac{\lambda_s^2}{\lambda^2}} \frac{q_s}{T_s}.$$

II.

Drude writes for the rotation on the hypothesis of the Hall-effect

$$\delta = \frac{-zH}{2n} \cdot \frac{\pi\nu'}{\lambda^2}, \quad [\text{p. 438.}]$$

where

$$\nu' = \sum \frac{\theta_n n_s}{\left(1 - \frac{b_s}{\tau^2}\right)^2 e_s'}$$

e_s' = charge on ion in electrostatic units,

e_s = charge on ion in electromagnetic units.

Transformation

Using the same notation as before, we have

$$\phi_s = \theta_s n_s, \quad e_s' = ce_s, \quad \frac{m_s \theta_s}{4\pi e_s'^2} = \tau_1^2, \quad \frac{\theta_s}{e_s'} = \frac{\lambda_s^2}{\pi c} \cdot \frac{e_s}{m_s},$$

since

$$\frac{\theta_s}{e_s'} = \frac{4\pi e_s'}{m_s} \cdot \frac{m_s \theta_s}{4\pi e_s'^2} = \frac{4\pi e_s c}{m_s} \tau_1^2 = \frac{4\pi \cdot e_s c}{m_s} \cdot \frac{\lambda_s^2}{4\pi^2 c^2} = \frac{e_s}{m_s} \cdot \frac{\lambda_s^2}{\pi c}.$$

Therefore

$$\nu = \pi c \cdot \nu' = \pi c \sum \frac{\phi_s}{\left(1 - \frac{\lambda_s^2}{\lambda^2}\right)^2} \frac{e_s \lambda_s^2}{m_s \cdot \pi c} = \sum \frac{\phi_s}{\left(1 - \frac{\lambda_s^2}{\lambda^2}\right)^2} \frac{e_s \lambda_s^2}{m_s}.$$

Hence

$$\delta = \frac{-zH \cdot \pi c \nu'}{2nc\lambda^2} = \frac{-zH \cdot \nu}{2nc \cdot \lambda^2}.$$

NOTE B.

Calculation of $\frac{q}{\tau H}$ and $\frac{e}{m}$.

The constants by which Drude calculates the magnetic rotation are in arbitrary units. For magnetic rotation in general $\delta = A_m [Hdz]$, where A_m is Verdet's constant in minutes. It is necessary to find the factor to reduce Drude's constants to radians. Writing δ_1 for his rotation for any wave-length, and A_m , Verdet's constant, for the same length, and k for the number of minutes in one radian, we get the following relations:—

$$\delta_1 = n \left[\frac{a'}{\lambda^2} + \frac{b'}{\lambda^2 - \lambda_1^2} \right] \quad \text{Hypothesis of Rotating Ions.} \quad (4)$$

$$\delta_1 = \frac{1}{n} \left[\frac{a''}{\lambda^2} + \frac{b''\lambda^2}{(\lambda^2 - \lambda_1^2)^2} \right] \quad \text{Hypothesis of Hall-effect.} \quad (9)$$

$$\delta_1 = A_m a.$$

$$\delta = \frac{n}{ak} \left[\frac{a'}{\lambda^2} + \frac{b'}{(\lambda^2 - \lambda_1^2)} \right] Hz = \frac{1}{nak} \left[\frac{a''}{\lambda^2} + \frac{b''\lambda^2}{(\lambda^2 - \lambda_1^2)^2} \right] Hz.$$

This expression gives the rotation in radians for any magnetic field and any thickness of the substance in terms of the constants given by Drude, and can be directly compared with either of the general theoretical formulæ,

I.

Calculation of $\frac{q}{\tau H}$.

The formula for the rotation deduced from the hypothesis of rotating ions can be put in the following form (4) in the case of certain substances

$$\delta = \frac{2\pi^2 n}{c} \left[\frac{C}{\lambda^2} + \frac{D}{\lambda^2 - \lambda_1^2} \right] \lambda,$$

and the experimental constants give a general formula in the form

$$\delta = \frac{n}{ka} \left[\frac{a'}{\lambda^2} + \frac{b'}{\lambda^2 - \lambda_1^2} \right] Hz.$$

Comparing

$$\frac{2\pi^2 D}{c} = \frac{b'H}{ka},$$

but from (5)

$$\frac{q_1}{\tau_1 H} = \frac{D\lambda_1^2}{HB_1} = \frac{c\lambda_1^2}{2\pi^2 B_1} \cdot \frac{b'}{ka},$$

where B_1 is a constant in the dispersion formula

$$n^2 = A + \frac{B_1}{\lambda^2 - \lambda_1^2}.$$

In practice B_1 and b' are expressed in the units corresponding to wave-lengths in 10^{-4} cm. This does not change their ratio. λ_1 in the above expression is in cm. Writing $\lambda_1 = w_1 \times 10^{-4}$, and assuming that B_1 and b' are expressed in their ordinary form, the results can be exhibited in tabular form thus:—

$$\frac{q}{\tau H} = \frac{w_1^2 b' 150}{B_1 \pi^2 k a}.$$

Substance.	B_1	w_1^2	b'	δ_1 for D line.	A_m for D line.	$\frac{q}{\tau H} \times 10^5$
Carbon Disulphide, .	·0433	·045	·153	·762	·042	3·9
Creosote,	·0277	·0433	·314	·745	·024	4·3

$$k = 3437 \cdot 75. \quad \alpha = \frac{\delta_1}{A_m}.$$

II.

Calculation of $\frac{e}{m}$.

The formula for the rotation on the hypothesis of the Hall-effect can be put in the following form (9) in the case of certain substances:

$$\delta = \frac{1}{2nc} \left[\frac{C'}{\lambda^2} + \frac{D'\lambda^2}{(\lambda^2 - \lambda_1^2)^2} \right] Hz;$$

and the experimental constants give a general expression in the form

$$\delta = \frac{1}{nka} \left[\frac{a''}{\lambda^2} + \frac{b''\lambda^2}{(\lambda^2 - \lambda_1^2)^2} \right] Hz.$$

Comparing $\frac{D'}{2c} = \frac{b''}{ka'}$,

but from (10) $\frac{e}{m} = \frac{D'}{B_1}$,

where B_1 is a constant in the dispersion equation

$$n^2 = A + \frac{B_1}{\lambda^2 - \lambda_1^2}.$$

Substituting $\frac{e}{m} = \frac{2cb''}{ka B_1}$.

In practice b'' and B' are expressed in the units corresponding to wave-lengths 10^{-4} cm. This does not change their ratio, and the results can be exhibited in tabular form thus :—

Substance.	B_1	b''	δ_1 for <i>D</i> line.	A_m for <i>D</i> line.	$\frac{e}{m} \times 10^7$
Carbon Disulphide, .	·0433	·2379	·762	·042	·53
Creosote, . . .	·0277	·380	·745	·024	·77

$$k = 3437 \cdot 75, \quad \alpha = \frac{\delta_1}{A_m}.$$

II.

SOME APPLICATIONS OF BESSEL'S FUNCTIONS TO
PHYSICS.

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It will be convenient at the outset to investigate certain expansions connected with these functions.

Retaining the notation which I employed in my previous paper (May, 1902), I employ further the symbol Y_0 to denote a second integral of the differential equation

$$\left(\frac{d^2}{dx^2} + \frac{1}{x} \frac{d}{dx} - 1 \right) u = 0,$$

satisfied by $u = K_0$. Y_0 may then be defined by

$$Y_0(x) = K_0(x) \cdot \int_{\infty}^x \frac{dx}{x K_0^2(x)}.$$

This may be written in the form

$$Y_0(x) = K_0(x) \cdot \log x + \epsilon K_0(x) + \phi(x),$$

ϵ being a certain numerical coefficient, $\phi(x)$ an even function of x , viz. $a_2 x^2 + a_4 x^4 + \dots$, the coefficients of which are determined by

$$\Delta \phi(x) + \frac{2}{x} K_1(x) = 0, \quad \Delta = \left(\frac{d^2}{dx^2} + \frac{1}{x} \frac{d}{dx} - 1 \right).$$

Substituting for $K_1(x)$ its value, we have the following determination for the coefficients a_2, a_4, a_6 :

$$a_2 = -\frac{1}{4}, \quad a_4 = -\frac{3}{128}, \quad a_6 = -\frac{11}{36 \times 384} a \dots,$$

a convergent series.

$Y_0(x)$ being thus defined, $Y_1(x)$ is given by $Y_1(x) = \frac{dY_0(x)}{dx}$. It will be observed that for all positive values of x , $Y_0(x)$ is negative.

Values of $K_0(x)$, $K_1(x)$, $Y_0(x)$, $Y_1(x)$ for large values of x .

We have seen that, as x increases indefinitely, $K_0(x)$ approaches the limit $\frac{e^x}{\sqrt{2\pi x}}$, K_1 to $\frac{e^x}{\sqrt{2\pi x}}$.

Substituting in the first expression for $Y_0(x)$ we find

$$-Y_0(x) = \frac{e^x}{\sqrt{2\pi x}} \int_x^\infty \frac{2\pi dx}{e^{2x}} = \frac{\sqrt{2\pi}}{2} \frac{e^{-x}}{\sqrt{x}};$$

$$\therefore Y_1(x) = \frac{\sqrt{2\pi}}{2} \frac{e^{-x}}{\sqrt{x}}.$$

Assume now for x large

$$K_0(x) = \frac{e^x}{\sqrt{2\pi x}} \phi(z), \text{ where } z = \frac{1}{x}.$$

Then $\phi(z)$ satisfies the differential equation

$$\left(z^2 \frac{d^2}{dz^2} + (2z - 2) \frac{d}{dz} + \frac{1}{4} \right) \phi(z) = 0;$$

whence writing $\phi(z) = 1 + a_2 z^2 + \dots + a_m z^m$, we have

$$a_{m+1} = \frac{(2m+1)^2}{8(m+1)} a_m,$$

giving rise to a semiconverging series.

Similarly assuming

$$Y_0(x) = -\frac{e^{-x}}{\sqrt{x}} \cdot \frac{\sqrt{2\pi}}{2} \phi(z),$$

we find, putting $\phi(z) = 1 + b_1 z + \dots - b_m z^m$,

$$b_{m+1} = -\frac{(2m+1)^2}{8(m+1)} b_m,$$

giving another semiconverging series.

We thus find the series for large values of x

$$K_0(x) = \frac{1}{\sqrt{2\pi}} \frac{e^x}{\sqrt{x}} \left\{ 1 + \frac{z}{8} + \frac{9z^2}{128} + \dots \right\}; \quad (1)$$

$$Y_0(x) = -\frac{\sqrt{2\pi}}{2} \frac{e^{-x}}{\sqrt{x}} \left\{ 1 - \frac{z}{8} + \frac{9z^2}{128} \dots \right\}; \quad (2)$$

whence differentiating, we have

$$K_1(x) = \frac{1}{\sqrt{2\pi}} \frac{e^{-x}}{\sqrt{x}} \left\{ 1 - \frac{3z}{8} - \frac{5}{3} \frac{9}{128} z^2 \dots \right\}; \quad (3)$$

$$Y_1(x) = \frac{\sqrt{2\pi}}{2} \frac{e^{-x}}{\sqrt{x}} \left\{ 1 + \frac{3z}{8} - \frac{5}{3} \frac{9}{128} + \dots \right\}; \quad (4)$$

whence

$$K_1(x) Y_1(x) = \frac{1}{2x} \left(1 - \frac{3z^2}{8} \dots \right). \quad (5)$$

It is to be noted that it is easily seen from the definitions that

$$K_0(x) Y_1(x) - K_1(x) Y_0(x) = \frac{1}{x}. \quad (6)$$

I should add that I have, in the present paper, employed the symbols $\sigma(u)$, $\delta(u)$ to denote $\cosh(u)$, $\sinh(u)$.

APPLICATIONS.

A.—*Heat Conduction.*

The terminal faces of a solid conducting-cylinder are maintained at zero temperature, the curved surface at temperature V , to find the temperature at any point of interior.

Let a be radius of cylinder, $2b$ its height; let the middle point of the axis of cylinder be taken as axis of z , and take

$$n = (2s + 1) \frac{\pi}{2b},$$

s having all integer values, including 0; then the expression for v will be

$$v = \frac{4V}{\pi} \sum_s K_0(nr) / K_0(na) (-1)^s \frac{1}{2s + 1} \cos nz. \quad (7)$$

Let the cylinder be flat; then, for values of r corresponding to points near curved surface, we may employ approximately the formula

$$\frac{e^x}{\sqrt{2\pi x}} \text{ for } K_0(x), \text{ where } x = nr.$$

We may then write

$$v = \frac{4V}{\pi} \sqrt{\frac{a}{r}} \sum_s (-1)^s \frac{1}{2s + 1} e^{-n(a-r)} \cos nz = \frac{4V}{\pi} \sqrt{\frac{a}{r}} \tan^{-1} U, \quad (8)$$

where

$$U = \cos \frac{\pi z}{2b} \tan 2 \tan^{-1} \frac{e^{-\pi(a-r)}}{2b},$$

a formula which gives the diminution of temperature as we proceed into interior.

B.—*Electrical—Theory of Leyden Jar—Finite Dimensions.*

Let R, R' be the radii of the bounding surfaces of the cylindrical sheath, the enclosed dielectric being air, V, V' the corresponding potentials. Then we may manifestly write for the potential v in interior of sheath $v = A \log r + B$, A, B being determined by $V = A \log R + B$, $V' = A \log R' + B$. For this expression (1) satisfies Laplace's equation, (2) gives values V, V' at curved surfaces, (3) represents with sufficient closeness the variation of v over the terminal faces.

We have then

$$A = \frac{V - V'}{\log \frac{R}{R'}}, \quad B = \frac{V \log R' - V' \log R}{\log \frac{R'}{R}}.$$

The total charge is then

$$\frac{1}{4\pi} \cdot 2\pi \cdot \frac{V - V'}{\log \frac{R}{R'}} l = \frac{l}{2} \cdot \frac{V - V'}{\log \frac{R}{R'}},$$

where l = length of cylinder.

Charges on inner Surface of inner Tin-foil, and outer Surface of outer Tin-foil.

Neglecting now thickness of sheath, suppose the hollow cylinder of radius R prolonged to a very great length L . We may then, taking $n = \frac{8\pi}{2L}$ and centre of cylinder as origin, s having all odd values, represent potential in cylinder by $v_1 = \Sigma B_n K_0(nr) \cos nz$, and in external space by $v_2 = \Sigma A'_n Y_0(nr) \cos nz$. Let potential at bounding surface between cylinder and external space be represented by $V = (A_n Y_0(nr) + B'_n K_0(nr)) \cos nz$, and let the unital charges on the inner surface of inner, on outer surface of outer tin-foil, and on surfaces of condenser be denoted by e_1, e_2, e, e' , respectively, each of these being q.p. uniform over its surface.

We have then the following data :

$$\text{From } z = 0 \text{ to } z = L, \quad V = v_1;$$

from

$$z = 0 \text{ to } z = l, \quad \frac{dV}{dr} - \frac{dv_1}{dr} = 4\pi (e - e_1);$$

from $z = l$ to $z = L$, $\frac{dV}{dr} - \frac{dv_1}{dr} = 0$.

The general Fourier expression for $\frac{dV}{dr} - \frac{dv_1}{dr}$, for $r = R$, is then

$$\frac{2}{L} \cdot 4\pi (e - e_1) \cos nz \int_0^l \cos nz dz,$$

or

$$\frac{8\pi}{L} (e - e_1) \sum \cos nz \cdot \frac{\sin (nl)}{n} = \sum k_n \cos nz.$$

Similarly, for $r = R'$, we have from

from $z = 0$ to $z = L$, $V = v_2$;

from

$$z = 0 \text{ to } z = l, \quad \frac{dV}{dr} - \frac{dv_2}{dr} = 4\pi (e_2 - e');$$

from

$$z = l \text{ to } z = L, \quad \frac{dV}{dr} - \frac{dv_2}{dr} = 0;$$

$$\therefore \text{ for } r = R', \quad \frac{dV}{dr} - \frac{dv_2}{dr} = \frac{8\pi}{L} (e_2 - e') \times \sum \cos nz \cdot \frac{\sin nl}{n} = \sum k'_n \cos nz.$$

We have then the following equations:—

$$A_n Y_0(nR) + B_n K_0(nR) = B_n K_0(nR); \tag{9}$$

$$A_n Y_1(nR) + B'_n K_1(nR) = B_n K_1(nR) + \frac{1}{n} k_n; \tag{10}$$

$$A_n Y_0(nR') + B'_n K_0(nR') = A'_n Y_0(nR'); \tag{11}$$

$$A_n Y_1(nR') + B'_n K_1(nR') = A'_n Y_1(nR') + \frac{1}{n} k'_n. \tag{12}$$

From these we deduce by virtue of

$$K_0(nR) Y_1(nR) - K_1(nR) Y_0(nR) = \frac{1}{nR};$$

$$K_0(nR') Y_1(nR') - K_1(nR') Y_0(nR') = \frac{1}{nR'};$$

$$B_n = n_n R Y_0(nR) - n'_n R' Y_0(nR'). \tag{13}$$

Hence

$$4\pi e_1 = \sum (nR n_n Y_0(nR) - nR' Y_0(nR') n'_n) K_1(nR); \tag{14}$$

$$V = \sum (n_n R Y_0(nR) - n'_n R' Y_0(nR')) K_0(nR). \tag{15}$$

From these two equations, the initial charges e_1, e_2 are determined in terms of e, e' . It is manifest, since $e + e' = 0$, q. p., that e_1, e_2 are each small compared with the condenser-charge e .

Applying the same method, we may discuss the charge on an indefinitely thin metallic cylinder of length $2l$, electrified to potential V .

Taking axes as before, and prolonging the cylinder as before to indefinitely great length L , we have for the potential inside cylinder $v = \sum B_n \cos nz K_0(nr)$, and outside $v' = \sum A_n \cos nz Y_0(nr)$. We have then (1) from $z = 0$ to $z = L$, $v = v'$ for $r = R$. (2) Again, for

$$r = R, \quad \frac{dv'}{dr} - \frac{dv}{dr} = 4\pi e, \quad \text{from } z = 0 \text{ to } z = l,$$

e being unital charge, and $= 0$ from $z = l$ to $z = L$. The Fourier expression for $\frac{dv'}{dr} - \frac{dv}{dr}$ will then be

$$8\pi e \sum \cos nz \cdot \frac{\sin nl}{n} = k_n \cos nz.$$

We have thus the system

$$A_n Y_0(nR) = B_n K_0(nR), \quad (16)$$

$$A_n Y_1(nR) = B_n K_1(nR) + \frac{1}{nk_n}; \quad (17)$$

whence $B_n = n_n R Y_0(nR); \quad (18)$

whence $V = \sum B_n K_0(nR) = R \sum n_n K_0(nR) Y_0(nR), \quad (19)$

an equation determining e .

C.—*An indefinitely thin circular Plate, Radius R , has matter uniformly distributed over it: to find its Potential.*

Taking a cylinder of indefinite height l on the plate as base, we have inside this cylinder

$$\text{potential} = a(l - z) + \sum B_n K_0(nr) \cos(nz) = v,$$

where $n = \frac{s\pi}{2l}$, s having all positive odd values. Outside

$$\text{potential} = \sum A_n Y_0(nr) \cos nz = v'.$$

Hence, since for $r = R$, v , $\frac{dv}{dr}$ have the same values as v' , $\frac{dv'}{dr}$, we have

$$B_n K_0(nR) + \frac{2}{l} \frac{\alpha}{n^2} = A_n Y_0(nR), \quad (20)$$

$$B_n K_1(nR) = A_n Y_1(nR); \quad (21)$$

whence

$$B_n = \frac{2}{l} nR \cdot \frac{\alpha}{n^2} \cdot Y_1(nR). \quad (22)$$

Integrating the expression above for $v(z = 0)$ with respect to r , we find, substituting for B_n ,

$$2\pi \int_0^R r v dr = \alpha l \pi R^2 - \frac{2R^2}{l} \cdot 2\pi \Sigma \frac{\alpha}{n^2} K_1(nR) Y_1(nR) \quad (23)$$

$$= \frac{1}{\pi} \left\{ \frac{\pi^2}{8} \cdot 8\alpha l R^2 - 16\alpha l R^2 \Sigma K_1(nR) Y_1(nR) \frac{1}{s^2} \right\}. \quad (24)$$

Now it is known that $\Sigma \frac{1}{s^2} = \frac{\pi^2}{8}$.

Hence

$$2\pi \int_0^R v r dr = 8 \frac{\alpha l R^2}{\pi} \Sigma \frac{1 - 2K_1(nR) Y_1(nR)}{s^2}.$$

If now we write

$$\frac{s\pi R}{2l} = x, \quad \frac{\pi R}{2l} = dx,$$

the right-hand side assumes the form of the definite integral

$$2\alpha R^3 \cdot \int_0^x \frac{1 - 2K_1(x) Y_1(x)}{x^2} dx.$$

Now ρ being the uniform density $= \frac{\alpha}{2\pi}$, it is known that v at any point r of the plate

$$= 4\rho R E\left(\frac{r}{R}\right) = 2 \frac{\alpha R}{\pi} E\left(\frac{r}{R}\right)$$

Now, it is easily seen that

$$\int_0^R E\left(\frac{r}{R}\right) r dr = \frac{2}{3} R^2.$$

Hence we have

$$\frac{8}{3} \alpha R^3 = 2\alpha R^3 \cdot \int_0^\infty \frac{1 - 2K_1(x)Y_1(x)}{x^2} dx;$$

$$\therefore \int_0^\infty dx \cdot \frac{1 - 2K_1(x)Y_1(x)}{x^2} = \frac{4}{3}. \quad (25)$$

Again, equating the value of the potential given above for $z = 0$ with its value previously found, we have

$$\frac{2\alpha R}{\pi} E\left(\frac{r}{R}\right) = \alpha l - \frac{2\alpha R}{l} \Sigma \frac{1}{n} K_0(nr) Y_1(nR)$$

$$= \frac{8}{\pi^2} \alpha l \Sigma \frac{1}{s^2} - \frac{2\alpha}{l} \Sigma nR Y_1(nR) \frac{1}{n^2} K_0(nr).$$

Proceeding as before, we have then

$$2\alpha \frac{R}{\pi} E\left(\frac{r}{R}\right) = 2\alpha \frac{R}{\pi} \int_0^x \left(1 - x Y_1(x) K_0\left(\frac{rx}{R}\right)\right) \frac{dx}{x^2};$$

or

$$E\left(\frac{r}{R}\right) = \int_0^\infty \left(1 - x Y_1(x) K_0\left(\frac{rx}{R}\right)\right) \frac{dx}{x^2}, \quad (26)$$

an expression connecting the second elliptic complete function E with Bessel's functions.

If, in this formula, we put $r = 0$, we have

$$\frac{\pi}{2} = \int_0^\infty (1 - x Y_1(x)) \frac{dx}{x^2}; \quad (27)$$

if, again, $r = R$,

$$1 = \int_0^\infty (1 - x Y_1(x) K_0(x)) \frac{dx}{x^2}. \quad (28)$$

We have also

$$\frac{dV}{dr} = -\frac{2}{l} R\alpha \Sigma K_1(nr) Y_1(nR) = -\frac{2\alpha}{\pi} \cdot \int_0^\infty K_1\left(\frac{rx}{R}\right) Y_1(x) dx.$$

But also

$$\frac{dV}{dr} = \frac{2\alpha R}{\pi} \cdot \left(E\left(\frac{r}{R}\right) - F\left(\frac{r}{R}\right)\right) \frac{1}{r},$$

whence

$$\int_0^\infty K_1\left(\frac{rx}{R}\right) Y_1(x) dx = \frac{R}{r} \left(F\left(\frac{r}{R}\right) - E\left(\frac{r}{R}\right)\right). \quad (29)$$

It is further apparent that, if we take a cylinder of height ζ standing on the circular face, its radial attraction on any point r of either terminal face will be proportional to

$$\int_0^\infty \sin\left(\frac{\zeta x}{R}\right) \left| \frac{\zeta x}{R} \right| \cdot K_1\left(\frac{rx}{R}\right) Y_1(x) dx.$$

D.—Circular Disk at Constant Potential V in centre of Cylinder of large dimensions at Potential Zero.

We now assume for the inner cylinder

$$\text{Potential} = \alpha(l - z) + \sum B_n K_0(nr) \cos nz + \sum \beta_m J_0(mr) e^{-mz},$$

and for the outer

$$\text{Potential} = \sum A_n Y_0(nr) \cos nz, \quad n = \frac{s\pi}{2l},$$

s having all odd values.

Expressing the terms in $K_0(nr)$ in a series of $J_0(mr)$ terms, where the m are given by $J_1(mR) = 0$; and expressing that Potential = V for $z = 0$, we find for m , different from 0,

$$\beta_m = -\frac{2}{J_0(mR)} \sum_n B_n K_1(nR) \frac{1}{nR} \frac{n^2}{m^2 + n^2}; \quad (30)$$

while, corresponding to $m = 0$, we have

$$V = \alpha l + 2 \sum_n B_n \cdot \frac{1}{nR} K_1(nR). \quad (31)$$

The Fourier expression for the $\alpha(l - z)$ term is then, as before,

$$\frac{2\alpha}{l} \cdot \sum_n \frac{1}{n^2} \cos nz.$$

That for the β_m is easily seen by calculation of

$$\int_0^l e^{-mz} \cos nz dz,$$

to be $\frac{2}{l} \sum_m \frac{m}{n^2 + m^2} \beta_m J_0(mR) \cos nz$

$$= -\frac{4}{l} \cos nz \sum_m \frac{m}{n^2 + m^2} \sum_{n'} B_{n'} K_1(n'R) \frac{1}{n'R} \frac{n'^2}{m^2 + n'^2} = P_n \cos nz.$$

We have then, in virtue of the equivalence of potential and its differential coefficient with respect to r for the inner and outer cylindrical spaces, the system of equations

$$B_n K_0(nR) + \frac{2a}{l n^2} + P_n = A_n Y_0(nR); \quad (32)$$

$$B_n K_1(nR) = A_n Y_1(nR); \quad (33)$$

$$\therefore B_n = -nR Y_1(nR) \left(P_n + \frac{2a}{l n^2} \right); \quad (34)$$

whence, substituting in (31), we find

$$V = \alpha l - \frac{4a}{l} \sum_n K_1(nR) Y_1(nR) \frac{1}{n^2} - 2 \sum_n P_n Y_1(nR) K_1(nR). \quad (35)$$

In virtue of the relation $\sum \frac{1}{n^2} = \frac{4}{\pi^2} \cdot \frac{\pi^2}{8l^2}$, this equation may be written in the form

$$V = \frac{2a}{\pi} \int_0^\infty \frac{1 - 2K_1(x) Y_1(x)}{x^2} dx - 2 \sum_n P_n Y_1(nR) K_1(nR).$$

Now, independently, we know that in the present case $V = \frac{\pi \alpha R}{4}$.

Also we have seen that

$$\int_0^\infty \frac{1 - 2K_1(x) Y_1(x)}{x^2} dx = \frac{4}{3}.$$

We thus find

$$2 \sum P_n Y_1(nR) K_1(nR) = \left(\frac{8}{3\pi} - \frac{\pi}{4} \right) \alpha = \frac{32 - 3\pi^2}{12\pi} \alpha.$$

Now an approximate value for P_n is found by substituting in it for B_n , $-\frac{2a}{l n'^2} n'R Y_1(n'R)$. This gives, writing $nR = x$, $n'R = x'$,

$$P_n = \frac{8a}{l\pi} \sum_m \frac{a_m R^2}{x^2 + a_m^2} \int_0^\infty K_1(x') Y_1(x') \cdot \frac{dx'}{x'^2 + a_m^2},$$

a_m being a root of $J_1(x) = 0$;

$$\therefore 2 \sum_n P_n Y_1(nR) K_1(nR) = \frac{8a}{\pi^2} \sum_m a_m \cdot U^2,$$

where

$$U = \int_0^{\infty} K_1(x') Y_1(x') dx' \cdot \frac{1}{x'^2 + \alpha_m^2}.$$

Hence we have the approximate relation

$$\Sigma_m \alpha_m U^2 = \frac{\pi}{96} (32 - 3\pi^2).$$

E.—Circular Plate at Potential V fronts Indefinite Plane at distance ζ , at Potential Zero.

The cylindrical space S is now divided into two parts—one below, the other above, the circular plate.

In the former, the potential will be represented by

$$\alpha z + \Sigma_m \beta_m \delta(mz) J_0(mr) + \Sigma_n B_n K_0(nr) \sin nz;$$

in the latter, by

$$\alpha \frac{l-z}{l-\zeta} \zeta + \Sigma_m \beta_m \delta(m\zeta) J_0(mr) e^{-m(z-\zeta)} + \Sigma_n B_n K_0(nr) \sin nz;$$

and for space S' , generally by

$$\Sigma A_n Y_0(nr) \sin nz.$$

Proceeding as before, we have, expressing the constancy of potential over circular plate,

$$2\Sigma_n \cdot \frac{1}{nR} B_n K_1(nR) \frac{n^2}{m^2 + n^2} \frac{\sin n\zeta}{J_0(mR)} + \beta_m \delta(m\zeta) = 0;$$

$$2\Sigma_n \frac{1}{nR} B_n K_1(nR) \sin n\zeta + \alpha\zeta = V.$$

The coefficient P_n of $\sin nz$ in the Fourierian expansion for the β_m terms will then be

$$\frac{2}{l} \Sigma_m \frac{m e^{m\zeta}}{m^2 + n^2} \beta_m J_0(mR) = -\frac{4}{l} \sin n\zeta \Sigma_m \frac{m e^{m\zeta}}{(m^2 + n^2) \delta(m\zeta)} Q,$$

where

$$Q = \Sigma_{n'} \frac{1}{n'R} B_{n'} K_1(n'R) \frac{n'^2}{(m'^2 + n'^2)} \sin n'\zeta.$$

The equations asserting equivalence of the potential and its differential coefficient to r , for $r = R$, give now

$$B_n = -nR Y_1(nR) \left(P_n + \frac{2\alpha}{n^2 \zeta'} \sin n\zeta \right), \quad \zeta' = l - \zeta, \quad (35')$$

whence

$$V = \alpha \zeta - 4 \sum_n K_1(nR) Y_1(nR) \frac{\alpha}{n^2 \zeta'} \sin^2(n\zeta) - 2 \sum_n P_n K_1(nR) Y_1(nR) \sin n\zeta. \quad (36')$$

In evaluating now P_n , by substituting as before in it, for B_n , we may distinguish two cases :

I. ζ not $< R$.

Here, by the substitution of B_n , we shall have

$$P_n = \frac{16\alpha}{l(l-\zeta)} R^3 \sin(n\zeta) \sum_m \frac{\alpha_m}{x^2 + \alpha_m^2} \cdot Q,$$

where

$$Q = \sum_{n'} \frac{\sin^2 n' \zeta}{x'^2 + \alpha_m^2} K_1(n'R) Y_1(n'R).$$

We may evidently, since l becomes indefinitely large, write l for $l - \zeta$; so we shall find

$$P_n = \frac{16\alpha R^2 \sin n\zeta}{\pi l'} \sum_m \frac{\alpha_m}{x^2 + \alpha_m^2} \cdot \Omega_m,$$

$$\Omega_m = \int_0^\infty \frac{1}{x'^2 + \alpha_m^2} \sin^2 \frac{\zeta x'}{R} K_1(x') Y_1(x') dx';$$

$$\therefore \sum P_n K_1(nR) Y_1(nR) \sin n\zeta = \frac{16\alpha R}{\pi^2} \sum_m \alpha_m \Omega_m^2.$$

If, now, in the integral Ω_m , we write for $\sin^2 \frac{\zeta x}{R}$ its mean value = $\frac{1}{2}$ q. p., we shall have

$$\begin{aligned} V &= \alpha \zeta - 4 \sum_n K_1(nR) Y_1(nR) \frac{\alpha}{n^2 l} \sin^2(n\zeta) - 8 \frac{\alpha}{\pi^2} \sum_m \alpha_m \left\{ \int_0^\infty dx \frac{K_1(x) Y_1(x)}{(x^2 + \alpha_m^2)} \right\}^2 \\ &= \alpha \zeta - 4 \sum_n K_1(nR) Y_1(nR) \frac{\alpha}{n^2 l} \sin^2 n\zeta - \alpha R \frac{32 - 3\pi^2}{12\pi}. \end{aligned}$$

Now it is easily seen that

$$\zeta(l - \zeta) = 2 \sum \frac{1}{n^2} \sin^2(n\zeta).$$

We may therefore write

$$V = \frac{2\alpha R}{\pi} \int_0^\infty \frac{(1 - 2K_1(x)Y_1(x)) \sin^2 \frac{\xi x}{R}}{x^2} dx - \epsilon \alpha R, \quad (36)$$

where $\epsilon = \frac{32 - 3\pi^2}{12\pi}$, the equation determining α .

II. ζ small compared with R .

Here we may write $e^{m\zeta} = 1$, $\delta m\zeta = m\zeta$. We now find

$$\Sigma P_n K_1(nR) Y_1(nR) \sin n\zeta = \frac{8\alpha R}{\pi^2 \zeta} \Sigma \Omega_m^2,$$

$$\Omega_m = \int_0^\infty \frac{dx}{x^2 + \alpha_m^2} \sin^2 \frac{\xi x}{R} K_1(x) Y_1(x) dx.$$

This is seen to be of the order $\frac{\zeta^3}{R^3} \left(\log \left(\frac{R}{\zeta} \right) \right)^2$, and may therefore be neglected in terms of $\frac{\zeta^2}{R^2}$. We may then, in this case, write with great accuracy

$$V = \frac{2\alpha R}{\pi} \int_0^\infty dx \cdot \sin^2 \frac{\xi x}{R} \frac{1}{x^2} (1 - 2K_1(x)Y_1(x)).$$

If we divide this into two ranges, $x = 0$ to $x = 1$, $x = 1$ to $x = \infty$, we may write in the former $\sin \frac{\xi x}{R} = \zeta \frac{x}{R}$, this part of V becoming thus

$$\frac{\zeta^2}{R^2} \cdot \frac{2\alpha R}{\pi} \int_0^1 (1 - 2K_1(x)Y_1(x)) dx = \mu \frac{\zeta^2}{R^2}.$$

In the second part we may write

$$2K_1 Y_1 = \frac{1}{x} \left(\frac{3}{8x^2} - \frac{45}{128x^4} \right);$$

and the second part is seen by reduction to assume the form

$$\alpha \zeta + p \frac{\zeta^2}{R^2} + q \frac{\zeta^2}{R^2} \cdot \int_\epsilon^\infty \cos x \frac{dx}{x}, \quad \text{where } \epsilon = \frac{\zeta}{R},$$

p, q being certain numerical coefficients.

$$N_{\text{Dw}} \int_{\epsilon}^{\infty} \cos x \frac{dx}{x} = \int_1^{\infty} \cos x \frac{dx}{x} + \int_{\epsilon}^1 \cos x \frac{dx}{x}.$$

The former part is a finite number K ; the latter = $K' - \log \epsilon$, where K' is another finite number, giving finally

$$V = \alpha \left(\zeta + M \frac{\zeta^2}{R^2} \log \frac{\zeta}{R} + N \frac{\zeta^2}{R^2} \right). \quad (37)$$

Charge on Disk.

The total charge on disk = $\frac{1}{4\pi} \iint \left(\Delta \cdot \frac{dV}{dz} \right) r dr d\theta \cdot \Delta \frac{dV}{dz}$, being the discontinuity of $\frac{dV}{dz}$ in passing from the hither side of the disk to the further. In considering this now, we may neglect the terms in B_n as involving no discontinuity. The β terms may also be neglected as involving, when integrated, the factors $J_1(mR)$, which vanish. There remain only the terms in α . Now for hither side this term = α , for further = $-\frac{\alpha\zeta}{l-\zeta}$, giving discontinuity $\frac{\alpha l}{l-\zeta}$, or q. p. α . Hence total charge = $\frac{S\alpha}{4\pi}$, S being area of disk. Now, retaining only principal terms in equation for V , we have $V = \alpha\zeta$; \therefore total charge = $\frac{SV}{4\pi\zeta}$.

Charge on Back of Disk.

Neglecting the P_n terms, we have

$$B_n = -2\alpha \cdot R Y_1(nR) \frac{\sin n\zeta}{n\zeta'} = -2\alpha R Y_1(nR) \cdot \frac{\sin n\zeta}{nl}.$$

Now, total charge on back of disk

$$\begin{aligned} &= \frac{1}{2\pi} \cdot \iint (-\alpha \frac{\zeta}{l} \alpha S) + \frac{1}{2\pi} \cdot \iint r dr d\theta n B_n \cdot K_0(nr) \cdot \cos n\zeta \\ &= -\alpha \zeta \frac{S}{2\pi l} - \alpha \sum_n \frac{1}{\pi} \frac{1}{n} \sin 2n\zeta \cdot R K_1(nR) Y_1(nR). \end{aligned}$$

The former term vanishes for $l = \infty$; the latter

$$= -\frac{\alpha R^2}{\pi^2} \int_0^\infty \frac{1}{x} \sin 2\frac{\xi x}{R} K_1(x) Y_1(x) dx,$$

a charge negative and small of order $\frac{\xi}{R}$.

We can now solve the problem where two equal circular disks at potentials V, V' stand opposite one another at a distance small compared with their common radius. For, consider two cases: (1) The disks have equal potential $\frac{1}{2}(V' + V)$. Here it is manifest that we have a solution by supposing each disk equally charged, the charge at front and back being the same for each plate, the medial plane being one of zero normal attraction. The law of distribution of charge will be that of an isolated circular plate at constant potential. (2) One plate is at potential $\frac{1}{2}(V' - V)$; the other at potential $-\frac{1}{2}(V' - V)$. This is the case just investigated, the medial plane being now of potential zero.

Combining these, we obtain the solution required.

F.—Condenser formed of Circular Disk at Potential V , midway between Infinite Plates at Potential Zero.

Let h be the semi-interval between planes $mR = a_m$, where $J_1(a_m) = 0$, $n = s\frac{\pi}{2h}$, s having all positive odd values.

Then the potential being evidently symmetrical on either side of the disk, we may assume for it the expression

$$\alpha(h - z) + \sum_n B_n K_0(nr) \cos nz + \sum_m A_m J_0(mr) \left(\sigma(mz) - \frac{\sigma m h}{\delta m h} \delta mz \right),$$

for interior of cylinder standing on circular base; while for exterior space to ∞ we have as usual $\sum A_n Y_0(nr) \cos nz$.

On evaluation the Fourier term corresponding to A_m becomes

$$\begin{aligned} & \frac{2}{h} \frac{m}{m^2 + n^2} \frac{\sigma m h}{\delta(mh)} A_m \cos nz \\ &= \frac{2R^2}{h^2} A_m \left(1 + 2 \frac{a_m^2 h^2}{R^2 \pi^2 + a_m^2 h^2} + 2 \frac{a_m^2 h^2}{4R^2 \pi^2 + a_m^2 h^2} \dots \right) \frac{1}{a_m^2 + x^2}, \quad x = nR. \end{aligned}$$

Also

$$A_m = -2 \sum_n B_n K_1(n'R) \frac{n'}{R(m^2 + n'^2)} = -2 \sum_n B_n K_1(n'R) \frac{x'}{a_m^2 + x'^2},$$

where $x' = n'R$.

The coefficient of $B_n K_1(n'R)$ in the Fourier term corresponding to A_m will then be

$$- \cos nz \cdot \frac{4R^2}{h^2} \left\{ \frac{x'}{(a_m^2 + x'^2)(a_m^2 + x^2)} + \frac{2x'}{(a_m^2 + x^2)(a_m^2 + x'^2)} \left(\frac{a_m^2}{a_m^2 + u^2} + \frac{a_m^2}{a_m^2 + 4u^2} + \dots \right) \right\}, \quad x = \frac{\pi R}{h}.$$

Now,

$$\frac{a_m^2}{(a_m^2 + x^2)(a_m^2 + x'^2)(a_m^2 + u^2)} = - \left\{ \frac{x^2}{(x^2 - u^2)(x^2 - x'^2)(a_m^2 + x^2)} + \frac{x'^2}{(x'^2 - u^2)(x'^2 - x^2)(a_m^2 + x'^2)} + \frac{u^2}{(u^2 - x^2)(u^2 - x'^2)(a_m^2 + u^2)} \right\}$$

Now, it is easily seen that

$$\frac{x^2}{x^2 - u^2} + \frac{x'^2}{x'^2 - 4u^2} + \dots = -\frac{1}{2};$$

whence our coefficient assumes the form

$$- \frac{8R^2}{h^2} x' \cos nz \sum_{m, m} \frac{u^2}{(u^2 - x^2)(u^2 - x'^2)(a_m^2 + u^2)}.$$

Now (see *Transactions*, R.I.A., May, 1902),

$$\sum_m \frac{1}{a_m^2 + u^2} = \frac{1}{2u},$$

causing our coefficient to assume the form

$$- \frac{4R^2}{h^2} \cos nz x' \sum \frac{u}{(u^2 - x^2)(u^2 - x'^2)},$$

or for $z = 0$,

$$- \frac{4R^2}{h^2} x' \sum \frac{u}{u(u^2 - x^2)(u^2 - x'^2)}.$$

If, now, we replace x, x' by their values

$$x = \frac{s\pi R}{2h}, \quad x' = \frac{s'\pi R}{2h}$$

this becomes

$$-\frac{32s'}{\pi^2} \left\{ \frac{1}{(4 \cdot 1^2 - s^2)(4 \cdot 1^2 - s'^2)} + \frac{2}{(4 \cdot 2^2 - s^2)(4 \cdot 2^2 - s'^2)} \right\} = -\frac{32s'}{\pi^2} \epsilon_{ss'}.$$

In the case where $s = s'$, we proceed thus:—

Putting $x = x'$ we have

$$\begin{aligned} \frac{\alpha_m^2}{(\alpha_m^2 + x^2)^2 (\alpha_m^2 + u^2)} &= \frac{x^4 + \alpha_m^2 u^2}{(x^2 - u^2)^2 (\alpha_m^2 + x^2)^2} - \frac{x^2}{(x^2 - u^2) (\alpha_m^2 + u^2)^2} \\ &= \frac{x^2}{(x^2 - u^2) (\alpha_m^2 + x^2)^2} + \frac{u^2}{(x^2 - u^2)^2 (\alpha_m^2 + x^2)} - \frac{u^2}{(x^2 - u^2)^2 (\alpha_m^2 + u^2)}. \end{aligned}$$

Our coefficient then becomes, in this case,

$$-\frac{4R^2}{h^2} \cos nz \left(\frac{1}{4x^2} + \frac{1}{2} \sum_n \frac{1}{(x + u)^2} \right) = (\text{for } z = 0) -\frac{32}{\pi^2} s \epsilon_{ss}.$$

Our Fourier equations, then, derived from making $v, \frac{dv}{dr}$ have the same values for the boundary $r = R$ of internal and external cylindrical space, are

$$B_n K_0(nR) - \frac{32}{\pi^2} B_n K_1(nR) s \epsilon_{ss} - \frac{32}{\pi^2} \sum_n B_n K_1(n'R) s' \epsilon_{s's'} + \frac{2a}{n^2 h} \quad (38)$$

$$= A_n Y_0(nR),$$

$$B_n K_1(nR) = A_n Y_1(nR); \quad (39)$$

$$\begin{aligned} \therefore B_n &= \frac{32}{\pi^2} nR Y_1(nR) \{ B_n K_1(nR) s \epsilon_{ss} + \sum_n B_n K_1(n'R) s' \epsilon_{s's'} \} \\ &\quad - \frac{2a}{n^2 h} nR Y_1(nR). \end{aligned} \quad (40)$$

Writing, now, $B_1 K_1(nR) = \gamma_n$, multiplying by $K_1(nR)$, and remembering that

$$2nR K_1(nR) \gamma_n = 1,$$

we find the system of equations

$$\gamma_n = \frac{16}{\pi^2} (\gamma_n s \epsilon_{ss} + \sum_n \gamma_n s' \epsilon_{s's'}) - \frac{4ah}{\pi^2 s^2}. \quad (41)$$

These equations can now be solved by approximation.

For this purpose, we must calculate the numbers $\epsilon_{ss'}$, ϵ_{ss} .

Now,

$$\epsilon_{ss'} = \sum_{\mu} \frac{\mu}{(s^2 - 4\mu^2)(s'^2 - 4\mu^2)},$$

μ having all positive integer values.

Now,

$$\sum_{\mu} \frac{\mu}{(s^2 - 4\mu^2)(s'^2 - 4\mu^2)} = \frac{1}{(s'^2 - s^2)} \left(\sum_{\mu} \frac{\mu}{s^2 - 4\mu^2} - \sum_{\mu} \frac{\mu}{s'^2 - 4\mu^2} \right).$$

Now,

$$\frac{\mu}{s^2 - 4\mu^2} = -\frac{1}{4} \left(\frac{1}{2\mu - s} + \frac{1}{2\mu + s} \right);$$

$$\therefore \sum_{\mu} \frac{\mu}{s^2 - 4\mu^2} = -\frac{1}{4} \left\{ 2\Omega - 2 \left(\frac{1}{1} + \frac{1}{3} - \frac{1}{s} \right) + \frac{1}{s} \right\};$$

$$\therefore \epsilon_{ss'} = \frac{1}{4(s'^2 - s^2)} \left\{ \frac{1}{s'} - \frac{1}{s} + 2 \left(1 + \frac{1}{3} - \frac{1}{s} \right) - 2 \left(1 + \frac{1}{3} - \frac{1}{s'} \right) \right\} \quad (42)$$

Again,

$$s\epsilon_{ss} = \frac{1}{8s^2} + \frac{1}{4} \sum_{\mu} \frac{1}{(s + 2\mu)^2} = \frac{1}{8s^2} + \frac{1}{4} \left(\frac{\pi^2}{8} - \left(1 + \frac{1}{9} \dots \frac{1}{s^2} \right) \right). \quad (43)$$

Now,

$$\gamma_1 = \frac{16}{\pi^2} \gamma_1 \epsilon_{11} + \frac{256}{\pi^4} \gamma_1 (\epsilon_{13^2} + \epsilon_{15^2} \dots) - \frac{64ah}{\pi^4} \left(\frac{\epsilon_{13}}{9} + \frac{\epsilon_{15}}{25} \right) - \frac{4ah}{\pi^2}$$

$$= \text{q.p.} \frac{16}{\pi^2} \gamma_1 \epsilon_{11} - \frac{4ah}{\pi^2},$$

$$\gamma_3 = \frac{16}{\pi^2} \gamma_1 \epsilon_{13} - \frac{4ah}{9\pi},$$

$$\gamma_5 = \dots$$

Now, integrating our original expression for v over disk, and remembering that $J_1(a_m) = 0$, we find

$$\begin{aligned} V &= ah + \frac{4h}{\pi R} \sum \frac{1}{S} \gamma_n \\ &= ah + \frac{4h}{\pi R} \gamma_1 \left(1 + \frac{16}{\pi^2} \left(\frac{1}{3} \epsilon_{13} + \frac{1}{5} \epsilon_{15} \dots \right) \right) - \frac{16ah^2}{\pi^3 R} (K - 1), \quad (44) \end{aligned}$$

where

$$K = 1 + \frac{1}{3^3} + \frac{1}{5^3} \dots;$$

or, nearly,

$$V = ah + \frac{4h}{\pi R} \gamma_1 - \frac{16ah^2}{\pi^3 R} (K - 1). \quad (45)$$

Now,
$$\epsilon_{11} = \frac{\pi^2}{32} - \frac{1}{8}; \quad \therefore \gamma_1 \left(\frac{1}{2} + \frac{2}{\pi^2} \right) = -\frac{4ah}{\pi^2};$$

$$\therefore \gamma_1 = -\frac{8ah}{\pi^2 + 4}.$$

Or,

$$V = ah - \frac{ah^2}{\pi^3 R} \left(\frac{32}{\pi^2 + 4} + 16(K - 1) \right) = ah - \epsilon \frac{ah^2}{\pi^3 R}; \quad (46)$$

$$\therefore a = \frac{V}{h} \left(1 + \epsilon \frac{h}{\pi^3 R} \right).$$

Now, total charge on plate

$$= \frac{aR^2}{2} = \frac{1}{2}R^2 \frac{V_0}{h} \left(1 + \epsilon \frac{h}{R} \right),$$

the term in ϵ indicating the correction to be made for $\frac{h}{R}$ not indefinitely small. A further approximation will be found by taking note of the terms $\epsilon_{13}, \epsilon_{15}, \dots$ hitherto omitted. Their values will be found to be

$$\epsilon_{13} = -\frac{1}{24}, \quad \epsilon_{15} = -\frac{7}{360} \dots$$

This problem is discussed by Maxwell ("Electricity and Magnetism," vol. i.). I have given the investigation above as proceeding on definite lines of approximation, the degree of accuracy of which can be readily estimated, which can hardly be said to be the case in his method.

G.—*Theory of Guard-ring.*

Two large circular plates front one another at a distance h ; the upper has the ring between two circles R, R' (where $R' - R = B$ is small compared with R) cut out. The upper plate is at potential zero, the lower at potential V , to find the effect of the cutting out of the groove on the charge on the upper circular disk. Taking z from the upper plate, we have now three forms of potential:—

I. For cylinder on circular base, radius R , extending from upper to lower cylinder,

$$v = V \frac{z}{l} + \sum B'_n K_0(nr) \sin nz.$$

II. For cylindrical sheath between planes; between radii R, R' :

Here

$$v = V \frac{z}{l} + \alpha + \beta \log r + \frac{1}{2} \gamma r^2 + \gamma z (l - z) + \Sigma (A_n \gamma_0(nr) + B_n K_0(nr)) \sin nz,$$

where α, β are determined so that

$$\alpha + \beta \log r + \frac{1}{2} \gamma r^2$$

shall vanish for

$$r = R, \quad r = R'.$$

This gives

$$\alpha + \beta \log R + \frac{1}{2} \gamma R^2 = 0,$$

$$\alpha + \beta \log R' + \frac{1}{2} \gamma R'^2 = 0,$$

whence

$$\frac{\beta}{R} + \gamma R = -\gamma B - \frac{1}{6} \gamma \frac{B^2}{R},$$

$$\frac{\beta}{R'} + \gamma R' = \gamma B - \frac{1}{6} \gamma \frac{B^2}{R}.$$

III. For external cylinder between plates extending from R' to ∞ :

$$v = V \frac{z}{l} + \Sigma A'_n Y_0(nr) \sin nz.$$

We have then, proceeding in the usual method, the following equations.

$$A'_{n1} Y_0(nR') = A_n Y_0(nR') + B_n K_0(nR') + 8\gamma/n^3 l, \quad (47)$$

$$A_n Y_1(nR') = A_n Y_1(nR') + B_n K_1(nR') + 4\gamma B/n^2 l, \quad (48)$$

$$A_n Y_0(nR) + B_n K_0(nR) + 8\gamma/n^3 l = B'_n K_0(nR), \quad (49)$$

$$A_n Y_1(nR) + B_n K_1(nR) - 4\gamma B/n^2 l = B'_n K_1(nR). \quad (50)$$

$$n = \frac{s\pi}{l}, \quad s \text{ having all positive values.}$$

It will be noted here that the γ terms correspond only to s odd. Hence for s even we shall have

$$A'_n = A_n = B_n = B'_n = 0.$$

We shall therefore understand now, throughout, s to be odd.

The former pair of equations now give

$$B_n = -nR' Y_1(nR') 8\gamma/n^3 l + 4B\gamma nR' Y_0(nR') n^2 l; \quad (51)$$

the latter pair

$$A_n = nR K_0(nR) 4\gamma B/n^3 l + nR K_1(nR) \frac{8\gamma}{n^3 l}. \quad (52)$$

We have now to determine the constant γ . For this purpose, consider the value of $\frac{dv}{dr}$ in the sheath at upper plane close to circumference of circle, radius R . Here evidently we have

$$\frac{dv}{dr} = 0.$$

Similarly, close to circumference of circle, radius R' , we have

$$\frac{dv}{dr} = 0.$$

Hence, q. p.,

$$\frac{dv}{dr} = 0$$

at point midway.

This gives for $r = \frac{1}{2}(R + R')$,

$$n(A_n Y_0(nr) + B_n K_0(nr)) + V \frac{1}{l} + \gamma l = 0. \quad (53)$$

Now, for this value of r ,

$$Y_0 nr = e^{-\frac{1}{2}nB} Y_0(nR),$$

$$K_0(nr) = e^{-\frac{1}{2}nB} K_0(nR'), \text{ q. p.}$$

$$A_n Y_0(nr) + B_n K_0(nr) = e^{-\frac{1}{2}nB} \left(\frac{8\gamma}{n^2 l} P + 4\gamma B/n^2 l Q \right), \quad (54)$$

where

$$P = nR K_1(nR) Y_0(nR) - nR' K_0(nR') Y_1(nR'),$$

$$Q = nR K_0(nR) Y_0(nR) + nR' K_0(nR') Y_0(nR').$$

Remembering that

$$K_0(nR) Y_1(nR) - K_1(nR) Y_0(nR) = \frac{1}{nR},$$

we find

$$P = -1, \quad Q = -1, \text{ q. p.}$$

Our equation to determine γ then becomes

$$\frac{V}{l} + \gamma l - 4\gamma B \Sigma \frac{e^{-\frac{1}{2}nB}}{n^2 l} - 8\gamma \Sigma \frac{e^{-\frac{1}{2}nB}}{n^2 l} = 0. \quad (55)$$

In this expression, the term

$$4\gamma B \Sigma \frac{e^{-\frac{1}{2}nB}}{n l} = \frac{2\gamma B}{\pi} \log \frac{1 + e^{-\frac{\pi B}{2l}}}{1 - e^{-\frac{\pi B}{2l}}}.$$

The term

$$8\gamma\Sigma \frac{e^{-\frac{1}{2}nB}}{n^2l}$$

forms, in general, a rapidly converging series, so that we may write the equation to determine γ in the form

$$\frac{V}{l} + \lambda\gamma l = 0, \quad (56)$$

where λ is a numerical coefficient.

Now, integrating $\frac{dv}{dr}$ over circular disk, we have

$$4\pi \times \text{charge} = VS \frac{1}{l} + 2\pi R\Sigma B'_n K_1(nR).$$

Now

$$\begin{aligned} \Sigma B'_n K_1(nR) &= \Sigma A_n Y_1(nR) + B_n K_1(nR) - 4\gamma B\Sigma \frac{1}{n^2l} \\ &= -8\gamma\Sigma \frac{1}{n^3l} \left(e^{-nB} - 1 \right) + 4\gamma B\Sigma \frac{1}{n^2l} \\ &= 12\gamma B \cdot \Sigma \frac{1}{n^2l}, \text{ q. p.} = (12 \times 8) \frac{\gamma B}{l}. \end{aligned} \quad (57)$$

The added charge is then

$$\frac{96}{4\pi} \frac{\gamma B}{l^2} = M,$$

γ being determined as above.

This will be correct, neglecting smalls of order $M \frac{B}{R}$.

This problem has also been discussed by Maxwell, the same general remark applying as in previous.

H.—*Application to fluid Irrotational Motion.*

I. A thin cylindrical disk descends in a vertical cylinder of water, to the axis of which its plane is perpendicular, the centre of the disk lying on the axis. It is further supposed that the height of the cylinder is large compared with the radius of the disk, and the breadth large compared with the height.

Let ϕ be the velocity-potential of the fluid, and let $\frac{d\phi}{dz}$, where z is reckoned from the bottom of the cylinder, take the place of potential

in problem (E). Then from bottom of cylinder to disk, we have

$$\frac{d\phi}{dz} = \alpha z + \sum_m \beta_m \delta(mz) J_0(mr) + \sum_n B_n K_0(nr) \sin(nz),$$

the m system being determined by $J_1(mR) = 0$, the n system by

$$n = \frac{S\pi}{l}$$

below the disk, and above

$$\frac{d\phi}{dz} = \alpha \frac{l-z}{l-\zeta} \zeta + \sum_m \beta_m \delta(m\zeta) J_0 m r e^{-m(z-\zeta)} + \sum B_n K_0(nr) \sin nz,$$

to which will correspond

$$\phi = \alpha \left(\frac{z^2}{2} - \frac{1}{4} r^2 \right) + \sum_m \frac{1}{m} \beta_m \delta(mz) J_0(mr) - \sum_n \frac{1}{n} B_n K_0(nr) \cos nz,$$

below the disk, and above

$$\begin{aligned} \phi = \alpha \frac{\zeta}{l-\zeta} \left(lz - \left(\frac{z^2}{2} - \frac{1}{4} r^2 \right) \right) - \sum \frac{1}{m} \beta_m \delta(m\zeta) J_0(mr) e^{-mz-\zeta} \\ - \sum_n \frac{1}{n} B_n K_0 \overline{nr} \cos nz + C. \end{aligned}$$

The constant C will be determined by the consideration that, at the disk $z = \zeta$, the lower and upper ϕ coincide, for $r = R$.

This gives

$$\alpha \frac{l}{l-\zeta} \left(-\frac{\zeta^2}{2} - \frac{1}{4} R^2 \right) + \sum_m \frac{1}{m} \beta_m e^{m\zeta} = C. \quad (58)$$

Referring to the value of β_m in potential problems, it is easily seen that the last term on the left-hand side is, in general, negligible, so that we may write

$$C = \alpha \frac{l}{l-\zeta} \left(-\frac{\zeta^2}{2} - \frac{1}{4} R^2 \right). \quad (59)$$

Now, the kinetic energy T of the fluid

$$= \frac{1}{2} \iint \left(\frac{d\phi}{dz} = U \right) \Delta\phi,$$

when $\Delta\phi$ is the discontinuity of ϕ . This discontinuity now

$$= \alpha \frac{l}{l-\zeta} \frac{1}{4} (R^2 - r^2) + \text{discontinuity of terms in } J_0(mr).$$

These, however, vanish on integration by virtue of

$$J_1(mR) = 0.$$

Hence, we find

$$2T = a \frac{l}{l-\zeta} \frac{1}{4} \left(\pi R^4 - \frac{\pi}{2} R^4 \right) = a \frac{l}{l-\zeta} \cdot \frac{\pi R^4}{8}. \quad (60)$$

Also q. p. $V = a\zeta$, whence we have ζ being small compared with l

$$2T = V \cdot \frac{\pi R^4}{8\zeta} \frac{l}{l-\zeta}.$$

It is obvious that this formula will also give the kinetic energy of an infinite fluid due to the motion of two thin circular disks which are in motion towards one another with equal and opposite velocities, their distance being supposed small compared with their common radius.

If we suppose ζ comparable with R , but both small compared with l , the expression for the kinetic energy of the fluid will have the same form in a , but a will now be given in terms of V by

$$V = \frac{2aR}{\pi} \int_0^\infty \frac{1 - 2K_1(x_1)Y_1(x)}{x^2} \cdot \sin^2 \frac{\zeta x}{R} dx. \quad (61)$$

I.—Case where disk fits not quite tightly an enclosing cylinder radius R' , i.e. $R' = R + B$, where B is supposed small compared with R .

Let v , as before, be the potential corresponding to the vertical velocity of any point in the fluid. Then the expression of v for the internal cylindrical space above and below the disk will be the same as before, but that for the outer cylindrical sheath R, R' will now be

$$v' = A_n Y_0(nr) + B'_n K_0(nr),$$

where now the conditions of motion give

$$\frac{dv'}{dr} = 0,$$

for

$$r = R', \text{ i.e. } A_n Y_1(nR') + B'_n K_1(nR') = 0,$$

so that v' may be written

$$v' = A_n \left(Y_0(nr) - \frac{Y_1(nR')}{K_1(nR')} K_0(nr) \right).$$

Our boundary equations, then, between inner cylindrical space and sheath, give

$$B_n K_0(nR) + 2\alpha \frac{1}{ln^2} + P_n = A_n \left(Y_0(nR) - \frac{Y_1(nR')}{K_1(nR')} K_0(nR) \right), \quad (62)$$

$$B_n K_1(nR) = A_n \left(Y_1(nR) - \frac{Y_1(nR')}{K_1(nR')} K_1(nR) \right); \quad (63)$$

$$\therefore B_n/nR = (P_n + 2\alpha/ln^2) \left(\frac{Y_1(nR')}{K_1(nR')} K_1(nR) - Y_1(nR) \right). \quad (64)$$

Let us suppose, now, R not $< l$; then we may write for K_1 , Y_1 their exponential values, viz.,

$$\frac{Y_1(nR')}{K_1(nR')} = \pi e^{-2nR'} \left(1 + \frac{3}{4nR'} \dots \right),$$

$$K_1(nR) = \frac{1}{\sqrt{2\pi}} \frac{e^{-nR}}{\sqrt{nR}} \left(1 - \frac{3}{8nR} \dots \right),$$

$$Y_1(nR) = \frac{\sqrt{2\pi}}{2} \frac{e^{-nR}}{\sqrt{nR}} \left(1 + \frac{3}{8nR} \dots \right);$$

\therefore coefficient of $(P_n + 2\alpha/ln^2) = q. p.$

$$\sqrt{\frac{\pi}{2}} \left(e^{-2nB} - 1 \right) \frac{e^{-nR}}{\sqrt{nR}} \left(1 + \frac{3}{8} \cdot \frac{1}{nR} \right).$$

Neglecting the term in P_n as before, we have

$$\frac{1}{2\alpha} B_n = \sqrt{\frac{\pi}{2}} \frac{R}{l} - 2B \frac{e^{-nR}}{\sqrt{nR}} \left(1 + \frac{3}{8} \frac{1}{nR} \right);$$

i.e. B_n is small compared with $\frac{B}{l}$.

The kinetic energy of the fluid will then be given by

$$2T = \frac{Vl}{\zeta(l-\zeta)} \frac{\pi R^4}{8};$$

i.e. as disk descends,

$$\propto \frac{1}{\zeta(l-\zeta)}.$$

J.—Cylinder maintained full with orifice in middle of bottom.

Let U denote the vertical velocity at the top of cylinder, u that at orifice, both being supposed uniform over their respective sections. Consider, now, two cylinders—one standing on the orifice and reaching to the top of the vessel; the other extending from this to the external boundary of the vessel. Then, if the breadth of the cylindrical vessel be considerable compared with its height, we may write for the cylinder on orifice

$$\phi = B_0 + \sum B_n K_0(nr) \cos nz + Uz + \frac{u - U}{2l} (z^2 - \frac{1}{2}r^2),$$

where l is height of cylinder, $n = \frac{s\pi}{l}$, s having all integer values, and z is measured from the top.

For the external cylinder, we may write

$$\phi' = A_0 + k \log r + \sum A_n Y_0(nr) \cos nz + Uz - \frac{U}{2l} (z^2 - \frac{1}{2}r^2).$$

Now, the Fourier expression for z is

$$z = \frac{l}{2} - \frac{2}{l} \sum \frac{1}{n^2} \cos nz,$$

s having odd value only. The Fourier for z^2 is

$$z^2 = \frac{l^2}{3} + \sum \frac{4}{n^2} \cos nl \cos nz,$$

s having all values.

Also, r^2 may be regarded as the constant term in a Fourier's expansion.

We have, then, s differing from 0, and odd;

$$\begin{aligned} A_n Y_0(nR) - \frac{2U}{l} \frac{1}{n^2} - \frac{4U}{n^2} \frac{1}{2l} \cos nl \\ = B_n K_0(nR) - \frac{2U}{l} \frac{1}{n^2} + \frac{4(u - U)}{n^2} \frac{\cos nl}{2l}; \end{aligned}$$

for s even the term $-\frac{2U}{l} \frac{1}{n^2}$ will vanish from both sides. In general, therefore, we shall have

$$A_n Y_0(nR) = B_n K_0(nR) + \frac{4n}{2ln^2} \cos nl; \quad (65)$$

$$\text{also,} \quad A_n Y_1(nR) = B_n K_1(nR), \quad (66)$$

$$\text{giving} \quad B_n = -nR \frac{4u}{2ln^2} \cos nl Y_1(nR), \quad (67)$$

$$A_n = -nR \frac{4u}{2ln^2} \cos nl K_1(nR). \quad (68)$$

The constant terms corresponding to $s = 0$ give

$$A_0 + \frac{U}{4l} R^2 + U \frac{l}{2} - \frac{U}{2l} \frac{l^2}{3} + k \log R$$

$$= B_0 + U \frac{l}{2} + \frac{u-U}{2l} \frac{l^2}{3} - \frac{u-U}{4l} R^2;$$

i.e.
$$A_0 + k \log R = B_0 + \frac{u}{2l} \frac{l^2}{3} - \frac{u}{4l} R^2,$$

also
$$\frac{U}{2l} R + \frac{k}{R} = \frac{U+u}{2l} R.$$

We have, then,

$$k = -\frac{u}{2l} R^2.$$

B_0 may be taken = 0, and then

$$A_0 = \frac{u}{2l} \left(\frac{l^2}{3} - \frac{R^2}{2} + R^2 \log R \right), \quad (69)$$

$$A_0 + k \log r = \frac{u}{2l} \left(R^2 \log \frac{R}{r} + \frac{l^2}{3} - \frac{R^2}{2} \right). \quad (70)$$

Kinetic Energy of Motion.

This will be $-\frac{1}{2} U \iint V dS$ over upper surface, $+\frac{1}{2} u \iint V dS$ over orifice. The former of these, remembering that U may be neglected when compared with u , and R when compared with R' , becomes

$$\pi U \left\{ \frac{u}{2l} \left(\frac{l^2}{3} - \frac{R^2}{2} \right) \frac{R'^2 - R^2}{2} + R^2 \left(\frac{R'^2}{2} \log \frac{R}{R'} + \frac{R'^2 - R^2}{4} \right) \frac{u}{2l} \right.$$

$$\left. - \frac{u}{16l} (R'^4 - R^4) - \sum \frac{1}{n} A_n R Y_1(nR) + \sum \frac{1}{n} B_n R K_1 n R \right\}.$$

Simplifying, as above, and remembering that the two last terms vanish, this becomes

$$\pi U u \frac{l}{12} R'^2 - \pi \frac{uU}{16l} R'^4.$$

Or, since $UR'^2 = uR^2$,

$$- \pi \frac{u^2 R^2 R'^2}{16l} + \frac{\pi u^2}{12l} l^2 R^2$$

$$= \pi u \left\{ \int_0^K u \frac{l}{2} r dr - \frac{u}{4l} \int_0^K r^3 dr + \sum \frac{1}{n} B_n R K_1 n R \cos n l \right\}.$$

Hence, confining ourselves to principal term,

$$\text{energy} = \frac{\pi u^2 R^2 R'^2}{16l}.$$

Equation of Pressure.

We have

$$p = -\frac{1}{2}v^2 - \frac{d\phi}{dt} + F(t) + gz. \quad (71)$$

To determine $F(t)$, consider centre of upper surface. For this point evidently $v = U$. Also

$$\frac{d\phi}{dt} = -\frac{2}{l} R \frac{du}{dt} \sum_n \cos nl \frac{Y_1 n R}{n R} = \frac{2}{l} R \frac{du}{dt} \cdot \gamma,$$

where

$$\gamma = \frac{1}{R \frac{\pi}{l}} Y_1 \frac{R\pi}{l} - \frac{1}{2R \frac{\pi}{l}} Y_1 \frac{2R\pi}{l} \dots$$

We have, then, Π denoting atmospheric pressure,

$$\Pi = -\frac{1}{2}U^2 - \frac{2}{l} \gamma R \cdot \frac{du}{dt} + F(t), \quad (72)$$

which determines $F(t)$. Assuming the same equation to hold for a distance below the orifice, small compared with the height l of the cylinder, but large compared with radius of orifice, we have

$$\Pi = -\frac{1}{2}u^2 - \frac{2}{l} \gamma' R \frac{du}{dt} + F'(t) + gh,$$

whence

$$\frac{1}{2}(u^2 - U^2) = \frac{2R}{l} \frac{du}{dt} (\gamma - \gamma') + gh,$$

where

$$\gamma' = \frac{1}{R \frac{\pi}{l}} Y_1 \frac{R\pi}{l} + \frac{1}{2R \frac{\pi}{l}} \cdot Y_1 \frac{2R\pi}{l}.$$

This gives the equation determining the law of variation of u till steady motion is attained. When $\frac{R}{l}$ is small, $\gamma' - \gamma$ is proportional

to $\int_0^\infty \frac{Y_1(x) dx}{x}$. We may evidently write on the left-hand side u^2 for $u^2 - U^2$.

Form of Issuing Jet, where steady motion has been attained.

Consider a distance ζ below orifice conditioned as above; and let u^2 denote the vertical velocity which may now be assumed uniform over cross-section, the horizontal velocity also being now negligible. We have, then, $\frac{1}{2}(u'^2 - U^2) = g(h + \zeta)$. Also, evidently $UR'^2 = uR^2 = u'\rho^2$, where ρ is radius of cross-section corresponding to ζ . The equation to the curve of the jet is therefore

$$\frac{1}{2} \cdot \frac{u^2 R^4}{\rho^4} - \frac{1}{2} U^2 = g(h + \zeta), \quad (73)$$

or neglect U^2 ,

$$\rho^4 = \frac{u^2 R^4}{2(g h + \zeta)}.$$

Stream Lines and Radial Velocity.

The vertical velocity or $\frac{d\phi}{dz}$ at any point is given by

$$\frac{d\phi}{dz} = \frac{2uR}{l} \sum_n \cos nl \cdot K_0(nr) Y_1(nR) \sin nz + u \frac{z}{l} + U$$

for points in internal cylinder, and by

$$\frac{d\phi}{dz} = \frac{2uR}{l} \sum_n \cos nl Y_0(nr) K_1(nR) \sin nz + U \left(1 - \frac{z}{l}\right)$$

for external cylinder. If we write $z = l - \zeta$, the former of these expressions may be written

$$-\frac{2u}{\pi} \int_0^\infty \sin \frac{\zeta x}{R} \cdot K_0 \frac{rx}{R} Y_1(x) dx + u(l - \zeta) + U,$$

and the latter

$$-\frac{2u}{\pi} \int_0^\infty \sin \left(\frac{\zeta x}{R}\right) Y_0 \left(\frac{rx}{R}\right) K_1(x) dx + U \frac{\zeta}{l},$$

provided R be sufficiently small with respect to l to allow us to substitute integrals for sums.

Similarly for internal cylinder

$$\frac{d\phi}{dr} = - \sum \frac{2uR}{l} \cos nz K_1(nr) Y_1 nR - \frac{u}{2l} r;$$

for external cylinder

$$\frac{d\phi'}{dr} = -\Sigma \frac{2uR}{l} \cos nz \cos nl Y_1(nr) K_1 nR + \frac{U}{2l} r - \frac{U}{2l} \frac{R'^2}{r},$$

giving in internal cylinder the stream line equation

$$\frac{2uR}{l} \Sigma \cos nl \frac{1}{n} Y_1(nR) r K_1(nr) \sin nz + \frac{u}{2l} r^2 z + U \frac{r^2}{2} = C,$$

and in external cylinder

$$\frac{2uR}{l} \Sigma \cos nl \frac{1}{n} r Y_1(nr) \sin nz \cdot K_1(nR) + U \frac{r^2}{2} - \frac{U}{2l} r^2 z + \frac{U}{2l} R'^2 z = C.$$

If $\frac{R}{l}$ be small, the trigonometric terms may be replaced for internal cylinder by

$$-\frac{2u}{\pi} \int_0^\infty \sin \frac{\xi x}{R} K_0\left(\frac{ru}{R}\right) Y_1(x) dx - \frac{2u}{\pi} \int \cos \frac{\xi x}{R} K_1 \frac{rx}{R} Y_1(x) dx,$$

and for external by

$$-\frac{2u}{\pi} \int_0^\infty \sin \frac{\xi x}{R} Y_0\left(\frac{rx}{R}\right) K_1(x) dx - \frac{2u}{\pi} \int_0^\infty \cos \frac{\xi x}{R} Y_1\left(\frac{ru}{R}\right) K_1(x) dx.$$

If, now, we refer back to the expressions previously found for the attraction-components of a circular disk over which matter is uniformly distributed, we shall find that these are proportional both for internal and external cylinders to the corresponding velocity components in the fluid-motion problem. In particular, we see that the radial velocity-component at orifice

$$= -\frac{u}{2l} r + \frac{1}{\pi} \cdot 2u \frac{R}{r} \left\{ F\left(\frac{r}{R}\right) - F\left(\frac{r}{R}\right) \right\},$$

which is infinite at edge, as it should be from general theory of fluid irrotational motion, and vanishes for $r = 0$,

APPLICATION TO THE THEORY OF ELASTICITY.

K.—Torsion of Right Cylinder.

Assume

$$u = \Sigma_m A_m J_1(mr) \frac{y}{r} \delta(mz);$$

$$v = -\Sigma_m A_m J_1(mr) \frac{x}{r} \delta(mz);$$

$$w = 0.$$

Origin at Middle of Axis.

These expressions give dilatation $\theta = 0$, and satisfy the internal equations of equilibrium. To calculate the surface forces we have

$$\frac{du}{dx} = \Sigma A_m \frac{xy}{r} \delta(mz) \left(\frac{m}{r} J_0(mr) - \frac{2}{r^2} J_1(mr) \right) = - \frac{dv}{dy},$$

$$\frac{du}{dz} + \frac{dw}{dx} = \Sigma_m \frac{my}{r} A_m J_1(mr) \sigma(mz),$$

$$\frac{dv}{dz} + \frac{dw}{dy} = \Sigma_m A_m \times -m \frac{x}{r} J_1(mr) \sigma(mz),$$

$$\frac{du}{dy} + \frac{dv}{dx} = \frac{y^2 - x^2}{r} \Sigma_m A_m \sigma(mz) \cdot \left\{ \frac{m}{r} J_0(mr) - \frac{2}{r^2} J_1(mr) \right\}.$$

The corresponding stresses are then given by

$$N_1 = 2\mu \frac{1}{r} xy \Sigma_m A_m \Omega \delta(mz) \quad (\text{where } \Omega = \frac{m}{r} J_0(mr) - \frac{2}{r^2} J_1(mr)).$$

$$N_2 = -N_1, \quad N_3 = 0,$$

$$T_1 = -\mu \frac{x}{r} \Sigma A_m J_1(mr) \sigma(mz) m;$$

$$T_2 = \mu \frac{y}{r} \Sigma A_m J_1(mr) \sigma(mz) m;$$

$$T_3 = \mu \frac{y^2 - x^2}{r} \Sigma \sigma(mz) A_m \Omega.$$

It appears, then, that the components of stress on element-plane perpendicular to r are given by

$$X = y \Sigma A_m \Omega \sigma(mz), \quad Y = -x \Sigma A_m \Omega \sigma(mz), \quad Z = 0.$$

If, then, the m system be so chosen that $\Omega = 0$, for $r = a$, it appears that the curved surface is unacted on by stress.

Consider, now, the forces on terminal planes. These will be

$$\Sigma \frac{y}{r} m A_m J_1(mr) \delta(ml), \quad - \Sigma \frac{x}{r} m A_m J_1(mr) \delta(ml), \quad 0,$$

yielding torque $\Sigma m r A_m J_1(mr) \delta(ml)$, or shearing force $\Sigma m A_m J_1(mr) \delta(ml)$.

Now, we can prove that any function of r can be expressed between $r = 0$, $r = a$, in a series of the form $\Sigma a_m J_1(mr)$, where

generally the m system are given by $maJ_0(ma) = kJ_1(ma)$. For let m_1, m_2 be two roots of the m system, then

$$(1) \quad \int_0^a rJ_1(m_1r)J_1(m_2r) dr = 0.$$

For

$$\begin{aligned} \int_0^a rJ_1(m_1r)J_1(m_2r) dr &= -\frac{1}{m_1} aJ(m_1a)J_1(m_2a) + \frac{m'}{m} \int_0^a rJ_0'(m_1r)J_0(m_2r) dr \\ &= -\frac{1}{m_2} aJ_0(m_2a)J_1(m_1a) + \frac{m}{m'} \int_0^a rJ_0(m_1r)J_0(m_2r) dr; \end{aligned}$$

$$\begin{aligned} \therefore (m_1^2 - m_2^2) \int_0^a rJ_1(mr)J_1(m'r) dr &= m_2aJ_0(m_2a)J_1(m_1a) \\ &\quad - m_1(a)J_0(m_1a)J_1(m_2a), \end{aligned}$$

where the right-hand side vanishes in virtue of the condition satisfied by the m .

$$(2) \quad \int_0^a rJ_1^2(mr) dr = \frac{a^2}{2} J_1^2(ma) + \left(\frac{a^2}{2} - \frac{a^2}{k}\right) J_0^2(ma).$$

For

$$\begin{aligned} \int_0^a rJ_1^2(mr) dr &= -\frac{a}{ma} J_1(ma)J_0(ma) + \int_0^a rJ_0^2(mr) dr \\ &= -\frac{a}{m} J_0(ma)J_1(ma) + \frac{a^2}{2} J_0^2(ma) + m \int_0^a r^2 J_0(mr)J_1(mr) dr \\ &= \frac{a^2}{2} J_1^2(ma) + \frac{a^2}{2} J_0(ma)(J_0(ma) - \frac{1}{ma} J_1(ma)), \end{aligned}$$

which assumes form above in virtue of the relation

$$ma J_0(ma) - kJ_1(ma) = 0.$$

In the present case, it will be seen that $k = 2$, so that

$$\int_0^a rJ_1^2(mr) dr = \frac{a^2}{2} J_1^2(ma).$$

Let, now, any function $\phi(r)$ be supposed to be expressed in the form

$$\phi(r) = c_0r + \sum c_m J_1(mr),$$

where it will be noted that the first term corresponds to $m = 0$, the

first root of the equation of condition $maJ_0(ma) - kJ_1(ma) = 0$. We have, then, by what we have proved above,

$$\int_0^a r\phi(r)J_1(mr) dr,$$

for m different from 0,

$$= c_0 \int_0^a r^2 J_1(mr) dr + c_m \frac{a^2}{2} J_1^2(ma).$$

Now, remembering that $k = 2$, we have

$$\begin{aligned} \int_0^a r^2 J_1(mr) &= -\frac{1}{m} a^2 J_0(ma) + \frac{2}{m} \int_0^a r J_0(ma) \\ &= \frac{2}{m^2} a J_1(ma) - \frac{1}{m} a^2 J_0(ma) = 0. \end{aligned}$$

We have, then,

$$c_m = \frac{2}{a^2} \cdot \frac{1}{J_1^2(ma)} \int_0^a r\phi(r) J_1(mr) dr,$$

for m different from 0, while to determine c_0 we have

$$c_0 \frac{a^3}{3} = \int_0^a r\phi(r) dr.$$

Let now, for $\phi(r)$, be taken the supposed given distribution of shear over terminal; then we have to determine the

$$A_m, \quad mA_m \delta ml = 2/a^2 J_1^2(ma) \int_0^a r\phi(r) J_1(mr) dr.$$

In $m = 0$ we have

$$mA_m J_1(mr) = c_0 r = \frac{3}{a^3} \int_0^a r\phi(r) dr.$$

The corresponding terms in u, v will be

$$c_0 y \frac{\delta(mz)}{m}, \quad -c_0 x \frac{\delta mz}{m}, \quad \text{or} \quad c_0 y z, \quad -c_0 z x.$$

Suppose, now, $c_0 = 0$. This will be the case when the total torque vanishes over each terminal, i. e., the forces over this terminal constitute a system in rigid equilibrium.

In this case the stresses and strains depend for each term in m ,

on the exponential $\sigma(mz)$, and therefore decrease very rapidly as we go inward from the surface. This case, then, verifies St. Venant's general theory of equipollence.

We may now note specially three cases of distribution of shearing force :—

I. The c_m vanish, $\phi(r)$ being $c_0 r$.

We have now $u = c_0 yz$, $v = -c_0 zx$, $w = 0$.

This constitutes Coulomb's and St Venant's solution for circular cylinder under torsion.

II. The torque over terminal is confined to the neighbourhood of the centre.

Here

$$c_m = \frac{m}{a^2 J_1^2(ma)} \int_0^R r^2 \phi(r) dr,$$

R being radius of activity of terminal torque.

III. The action of terminal torque is confined to rim. Here the c_m are proportional to

$$\frac{1}{J_1(ma)},$$

while the

$$c_0 = \frac{3}{a^3} r \phi(r) dr = \frac{3}{a^3} \times \text{total torque}.$$

L.—Consider, now, the case where the equation determining the m is

$$J_1(ma) = 0.$$

We have now for the curved surface $u = v = w = 0$, i.e. the surface is held. The surface tractions which must operate for this purpose are

$$X = y \Sigma A_m \delta(mz) \frac{m}{a} J_0(ma), \quad Y = -x \Sigma A_m \delta(mz) \frac{m}{a} J_0(ma), \quad Z = 0,$$

i.e. a tangential force $\Sigma m A_m \delta(mz) \cdot J_0(ma)$.

To determine the A_m , we have now to express the given law of shearing force over terminal in a series

$$\phi(r) = c_0 r + \Sigma c_m J_1(mr).$$

We have now as before

$$\int_0^a r J_1(mr) J_1(m'r) = 0, \quad \int_0^a r J_1^2(mr) dr = \frac{a^2}{2} J_0^2(ma).$$

Also
$$\int_0^a r^2 J_1(mr) dr = -\frac{a^2}{m} J_0(ma).$$

We have then

$$c_m \frac{a^2}{2} J_0^2(ma) - \frac{c_0}{m} \cdot a^2 J_0(ma) = \int_0^a r \phi(r) J_0(mr) dr.$$

Also

$$\int_0^a r^2 \phi(r) dr = c_0 \frac{a^4}{4} + \sum c_m \cdot \frac{a^2}{m} J_0^2(ma),$$

from which two equations, c_0, c_m are determined, and thence A_m, A_0 as before.

M.—Suppose, now, that the curved surface is acted on by tangential forces, while the terminals are free.

We now assume

$$u = \sum B_n \sin nz K_1(nr) \frac{y}{r},$$

$$v = -\sum B_n \sin nz K_1(nr) \frac{x}{r},$$

$$w = 0,$$

where the origin is taken as before, the values of n being given by

$$n = \frac{s\pi}{2l},$$

s having all odd values, l denoting semi-height of cylinder.

The typical terms in the strains at the curved surface are then given by

$$\frac{du}{dx} = -\frac{dv}{dy} = B_n \frac{xy}{a} \Omega \sin nz, \quad \frac{dw}{dz} = 0,$$

$$\frac{dv}{dz} + \frac{dw}{dy} = -nB_n \frac{x}{a} K_1(na) \cos nz,$$

$$\frac{dw}{dx} + \frac{du}{dz} = nB_n \frac{y}{a} K_1(na) \cos nz,$$

$$\frac{du}{dy} + \frac{dv}{dx} = \frac{y^2 - x^2}{a} \Omega \sin nz.$$

Where a is radius of cylinder,

$$\Omega = \frac{d}{dr} \left(\frac{1}{r} K_1(nr) \right), \text{ for } r = a.$$

The corresponding stresses are then

$$\begin{aligned} N_1 &= -N_2 = 2\mu \frac{xy}{a} \Omega B_n \sin nz, & N_3 &= 0, \\ T_1 &= -\mu \frac{nx}{a} B_n K_1(na) \cos nz, & T_2 &= \frac{\mu xy}{a} B_n K_1(na) \cos nz, \\ T_3 &= \mu \frac{y^2 - x^2}{a} \Omega \sin nz. \end{aligned}$$

It appears, therefore, that there acts on each element plane of the curved surface a force whose type is $\Omega a B_n \sin nz$. The B_n will be known from the Fourier expression for actual force distribution.

A strip $d\sigma$ in breadth of the curved surface bounded by two near parallels to the axis is therefore acted on by a torque whose axis is normal to cylinder

$$\begin{aligned} &= a\Omega B_n d\sigma \int_{-h}^h z \sin nz dz = a\Omega B_n d\sigma \int_{-h}^h \frac{1}{n} \cos nz dz \\ &= a\Omega B_n d\sigma \frac{1}{n^2} 2 \sin nh = a\Omega B_n d\sigma \frac{1}{n^2} 2 \sin \frac{s\pi}{2}, \end{aligned}$$

the total torque being therefore

$$2a\Sigma\Omega d\sigma \frac{h^2}{\pi^2} B_n \frac{1}{s^2} \sin \frac{s\pi}{2}.$$

For a corresponding internal strip, the torque

$$= 2r\Sigma\Omega_r d\sigma \frac{h^2}{\pi^2} B_n \frac{1}{s_1} \sin \frac{s\pi}{2},$$

where $\Omega_r = \frac{d}{dr} \left(\frac{1}{r} K_1(nr) \right)$.

If the thickness of the cylinder be small compared with its breadth, we have

$$\begin{aligned} K_0(nr) &= \frac{1}{\sqrt{2\pi}} e^{nr} \sqrt{\sqrt{nr}}, & K_1(nr) &= \frac{e^{nr} \left(1 - \frac{1}{2nr} \right)}{\sqrt{2\pi} \sqrt{nr}}; \\ \therefore \Omega_r &= \frac{e^{nr}}{\sqrt{2\pi} \sqrt{nr}} \frac{n}{r} \left(1 - \frac{2}{nr} + \frac{1}{n^2 r^2} \right). \end{aligned}$$

It appears, therefore, that the torque diminishes rapidly from the surface according to the exponential law.

This corresponds for a circular cylinder to the result given in Tait and Thomson (Art. 728, p. 563, vol. i., 1st ed.).

Rotatory Motion of a Fluid, friction being taken account of.

In the problems we shall consider, we shall assume the cylindrical rotation formulæ

$$u = -\omega y, \quad v = \omega x, \quad w = 0,$$

where ω , the angular rotation, is a function of the distance r from the axis of the cylinder. The equations of motion are now

$$\frac{dp}{dx} = -\rho \dot{u} + \mu \nabla^2 u, \quad \frac{dp}{dy} = -\rho \dot{v} + \mu \nabla^2 v;$$

$$\therefore \rho \left(\frac{d\dot{v}}{dx} - \frac{d\dot{u}}{dy} \right) = \mu \nabla^2 \left(\frac{dv}{dx} - \frac{du}{dy} \right) = 2\mu \nabla^2 \zeta,$$

ζ being the molecular rotation.

Now,
$$\dot{u} = \frac{du}{dt} + u \frac{du}{dx} + v \frac{du}{dy} = \frac{du}{dt} - \omega^2 x,$$

$$\dot{v} = \frac{dv}{dt} + u \frac{dv}{dx} + v \frac{dv}{dy} = \frac{dv}{dt} - \omega^2 y.$$

Hence,

$$\frac{d\dot{v}}{dx} - \frac{d\dot{u}}{dy} = \frac{d}{dx} \frac{dv}{dt} - \frac{d}{dy} \frac{du}{dt} = 2 \frac{d\zeta}{dt};$$

$$\therefore \rho \frac{d\zeta}{dt} = \mu \nabla^2 \zeta,$$

an expression, we may observe, arrived at without assuming smallness of such terms as $u \frac{du}{dx}$ in comparison with $\frac{du}{dt}$.

Assume, now, $\zeta = e^{-mt} \phi(r)$; then, writing $\frac{m\rho}{\mu} = \alpha^2$, we have

$$\left(\frac{d^2}{dr^2} + \frac{1}{r} \frac{d}{dr} + \alpha^2 \right) \phi(r) = 0, \quad \text{or} \quad \phi(r) = C J_0(\alpha r).$$

We shall then obtain solutions of vortex problems by taking

$$\zeta = \Sigma A_m e^{-mt} J_0(\alpha r),$$

the system of m being determined by the particular conditions of the problem considered. The rotation ω is connected with the molecular rotation ζ by

$$2\zeta = 2\omega + r \frac{d\omega}{dr} = \frac{1}{r} \frac{d}{dr} (\omega r^2).$$

I. A cylinder of water of indefinite length, originally at rest, is set and maintained in motion by a constant spin Ω applied to the bounding surface to determine the state of motion of the water at any time t .

Assume $\zeta = \Omega + \sum c_m e^{-m t} J_0(a_m r)$, since, for $t \infty$, $\zeta = \Omega$; we have, then,

$$\omega r^2 = \Omega r^2 + 2 \sum c_m \frac{1}{a_m} e^{-m t} r J_1(a_m r) + F(t).$$

We have now the following conditions:—

(1). For $r = a$, at all times $\omega = \Omega$.

This condition will be satisfied by cancelling the term $F(t)$, and taking the a_m as the non-zero roots of $J_1(a_m a) = 0$.

(2). For $t = 0$, r between 0 and a , $\omega = 0$. This gives

$$\Omega r + 2 \sum \frac{c_m}{a_m} J_1(a_m r) = 0$$

between these limits. Multiply by $r J_1(a_m r)$, and integrate between 0 and a ; then

$$\Omega \int_0^a r^2 J_1(a_m r) dr + 2 \frac{c_m}{a_m} \int_0^a r J_1^2(a_m r) = 0.$$

Now, we have

$$\int_0^a r J_1^2(a_m r) dr = \frac{a^2}{2} J_0^2(a_m a),$$

$$\int_0^a r^2 J_1(a_m r) dr = -\frac{1}{a_m} a^2 J_0(a_m a);$$

$$\therefore c_m = + \frac{\Omega}{J_0(a_m a)};$$

whence, finally,

$$\omega r = \Omega r + 2 \Omega \sum_m e^{m t} J_1(a_m r) / a_m J_0(a_m a).$$

As t becomes large, we may retain only the first term of the \sum ; also, we have, q. p.,

$$J_0(a_m a) = \sqrt{\frac{2}{\pi a_m}}, \quad a_m = \frac{5\pi}{4a},$$

so

$$\omega r = \Omega r - 2 \Omega e^{-\frac{\mu}{\rho} \left(\frac{5\pi}{4a}\right)^2 t} \left/ \left(\frac{5\pi}{4a}\right)^{\frac{3}{2}} \cdot J_1\left(r \frac{5\pi}{4a}\right)\right.$$

If r be small compared with (a) , we shall have

$$\omega r = \Omega r (1 - \epsilon e^{-nt}),$$

where

$$\epsilon = \frac{1}{\sqrt{\frac{5\pi}{4a}}}, \quad n = \frac{\mu}{\rho} \left(\frac{5\pi}{4a}\right)^2.$$

II. *Vortex Decay.*

The vessel having arrived at a uniform state of spin, the containing cylinder is stopped.

We have in this case

$$\zeta = \Sigma c_m e^{-mt} J_0(a_m r);$$

ζ now vanishing for $t \infty$, this gives

$$\omega r^2 = 2\Sigma \frac{c_m}{a_m} e^{-mt} r J_1(a_m r) + F(t).$$

The conditions are now (1) for $r = a$ at all times $\omega = 0$. This gives, as before, $J_1(a_m a) = 0$, $F(t) = 0$. (2) For $t = 0$, $\omega = \Omega$.

This gives

$$\Omega r + 2\Sigma \frac{c_m}{a_m} J_1(a_m r),$$

whence we have

$$c_m = -\frac{\Omega}{J_0(ma)};$$

giving now

$$\omega r = -2\Omega \Sigma e^{-\frac{\mu}{\rho} a_m^2 t} \frac{1}{a_m} \frac{J_1 a_m r}{J_0 a_m (a)},$$

as before, when t is large, we may reduce the Σ to its first term.

Decay of Energy.

The kinetic energy

$$\begin{aligned} K &= \rho\pi \int_0^a (\omega r)^2 r dr \\ &= 4\Omega^2 \pi \Sigma e^{-\frac{2\mu a_m^2 t}{\rho}} \frac{1}{a_m^2 J_0^2(a_m a)} \int_0^a r J_1^2(a_m r) dr \\ &= 2\pi\rho\Omega^2 a^2 \Sigma \frac{1}{a_m^2} e^{-\frac{2\mu a_m^2 t}{\rho}}, \end{aligned}$$

a result which may be written in the following form. Let K_0 be the original kinetic energy, $k_m = \alpha_m a$ the roots of $J_1(x) = 0$; then

$$K/K_0 = 8\Sigma \frac{1}{k_m^2} e^{-\frac{2\mu\alpha_m^2 t}{\rho}}.$$

This verifies, for $t = 0$. For we know that

$$\Sigma \frac{1}{k_m^2} = \frac{1}{8}.$$

Decay of Areal Motion.

Let A be the total moment of momentum at any time. We find in the same way

$$A/A_0 = 8\Sigma \frac{1}{k_m^2} e^{-\frac{\mu\alpha_m^2 t}{\rho}}.$$

III. *Vortex spreading in Space.*

Given initially, $\omega = \Omega$ from $r = 0$ to $r = a$, and $\omega r^2 = \Omega a^2$ from $r = a$ to $r = R$, while for all values of t , $\omega = 0$ for $r = R$.

Consider, first, the expression for ζ . Write

$$\zeta = k + \Sigma e_m e^{-\frac{\mu}{\rho} \alpha_m^2 t} J_0(\alpha_m r).$$

Now, any function ζ of r^2 may be expressed from $r = 0$ to $r = R$ in a series in $J_0(\alpha_m r)$, the α_m being given by $J_1(\alpha_m R) = 0$.

Now, putting $t = 0$, we have $\zeta = k + \Sigma e_m J_0(\alpha_m r)$; and this is to represent $\frac{\Omega}{2}$ from $r = 0$ to $r = a$, and 0 from $r = a$ to $r = R$. We have then

$$e_m \frac{R^2}{2} J_0^2(\alpha_m R) = \int_0^R r \zeta J_0(\alpha_m r) dr = \frac{\Omega}{2} \int_0^a r J_0(\alpha_m r) dr,$$

$$e_m = \frac{\Omega a J_1(\alpha_m a)}{\alpha_m R^2 J_0^2(\alpha_m R)};$$

To determine K we have, multiplying by r , and integrating from $r = 0$ to $r = R$,

$$k \frac{R^2}{2} = \frac{\Omega}{2} \cdot \frac{a^2}{2}, \quad k = \frac{\Omega a^2}{2R^2}.$$

To determine ω , we have now

$$\omega r^2 = \frac{\Omega a^2}{R^2} \cdot \frac{r^2}{2} + \sum 2c_m \frac{1}{a_m} r J_1(a_m r) e^{-\frac{\mu a_m^2 t}{\rho}}.$$

This satisfies the condition $\omega = 0$, for $r = R$, more and more closely as R increases indefinitely. In this case, which is that of vortex spreading from a uniform value inside an internal cylinder into infinite space, we may express the \sum terms as definite integrals. Let $x = a_m r$, then q. p.

$$dx = \frac{\pi r}{R}, \quad c_m = \frac{\pi}{2} \cdot \Omega a \frac{J_1(a_m a)}{R};$$

$$\therefore \omega = \frac{\Omega a}{r} \cdot \int_0^\infty \frac{dx}{x} J_1(x) e^{-\frac{\mu x^2 t}{\rho}} J_1\left(\frac{a}{r} x\right);$$

or writing $x = \frac{ry}{a}$,

$$\omega = \frac{\Omega a}{r} \cdot \int_0^r \frac{dy}{y} J_1(y) J_1\left(\frac{ry}{a}\right) e^{-\frac{\mu r^2}{\rho a^2} t}.$$

If we write for $J_1(y)$, $J_1\left(\frac{ry}{a}\right)$ their values in series

$$J_1(y) = \frac{y}{2} \left(1 - \frac{y^2}{8} + \frac{y^4}{192} \dots \right),$$

$$J_1\left(\frac{ry}{a}\right) = \frac{r y}{a} \left(1 - \frac{r^2 y^2}{8a^2} \dots \right),$$

we shall obtain a series

$$\omega = \Omega \sum A_m \int_0^r y^{2m+1} e^{-\frac{\mu y^2}{\rho a^2} t} dt.$$

Now,

$$\int_0^{\infty} y^{2m+1} e^{-\frac{\mu y^2}{\rho a^2} t} dt = \frac{1}{2} \frac{\rho a^2}{\mu} 2m \int_0^{\infty} y^{2m-1} e^{-\frac{\mu y^2}{\rho a^2} t} dt$$

$$= \frac{1}{2} m \left(\frac{\rho a^2}{\mu t} \right)^{m+1}.$$

We have thus an expression for ω proceeding by inverse powers of t .

Expression for ζ .

Similarly, we can express ζ , and find

$$\zeta = \frac{\Omega}{2} \frac{a}{r} \int_0^{\infty} J_0(x) J_1\left(\frac{ax}{r}\right) e^{-\frac{\mu x^2 t}{\rho r^2}} dx$$

$$= \frac{\Omega}{2} \frac{a}{r} \int_0^{\infty} J_1(y) J_0\left(\frac{ry}{a}\right) e^{-\frac{\mu y^2}{\rho a^2} t} dy,$$

an expression which can be similarly expanded with that for ω .

PROCEEDINGS

OF THE

ROYAL IRISH ACADEMY

VOLUME XXVI

SECTION B.—BIOLOGICAL, GEOLOGICAL, AND
CHEMICAL SCIENCE



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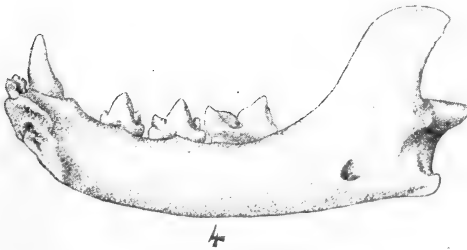
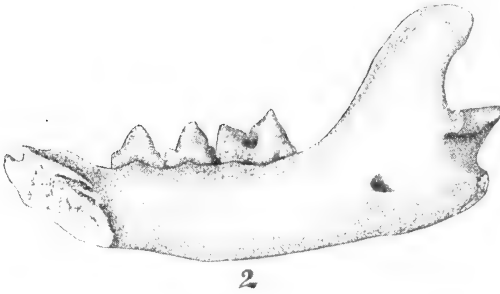
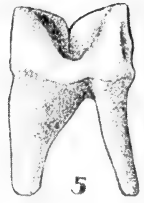
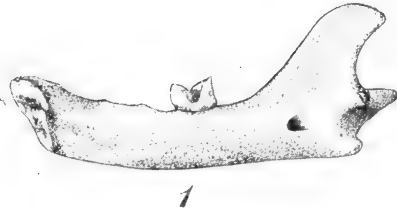
CONTENTS

SECTION B.—BIOLOGICAL, GEOLOGICAL, & CHEMICAL SCIENCE.

	PAGE
ADENEY (WALTER ERNEST), D.Sc., M.R.I.A. :—	
The Composition of a Nitrogen Mineral Water at St. Edmundsbury, Lucan,	50
COLE (GRENVILLE ARTHUR JAMES), F.G.S., M.R.I.A. :—	
On Contact-phenomena at the junction of Lias and Dolerite at Portrush. (Plate II.),	56
EBRILL (GEORGE), see RYAN (HUGH).	
ELLES (GERTRUDE L.), see FEARNSIDES (WILLIAM G.).	
FEARNSIDES (WILLIAM G.), M.A., F.G.S., GERTRUDE L. ELLES, D.Sc., AND BERNARD SMITH, M.A., F.G.S. :—	
The Lower Palæozoic Rocks of Pomeroy. (Plates VII, VIII.),	97
KILRÖE (JAMES R.) :—	
The River Shannon : its present Course and Geological History. (Plates III.-VI.),	74
The Silurian and Metamorphic Rocks of Mayo and West Galway. (Plates IX., X.),	129
MARSDEN (ROBERT SYDNEY), D.Sc., M.B., F.R.S.E., M.R.I.A. :—	
Sixteen years' Observations on the Relations between Temperature and the spread of Scarlatina, Measles, and Typhoid Fever,	46
METTAM (ALBERT EDWARD), B.Sc., M.R.I.A. :—	
Studies in Tuberculosis, I.-II.,	67

	PAGE
PRAEGER (ROBERT LLOYD), B.E., M.R.I.A. :— Irish Topographical Botany: Supplement, 1901–1905,	13
RYAN (HUGH), D.Sc., F.R.U.I., M.R.I.A., AND GEORGE EBRILL, B.A. :— Note on the Action of Emulsine on β -Glycosides,	53
SCHARFF (ROBERT FRANCIS), Ph.D., B.Sc., M.R.I.A. :— On the former Occurrence of the African Wild Cat (<i>Felis ocreata</i> , Gmel.) in Ireland. (Plate I.),	1
SMITH (BERNARD), <i>see</i> FEARNSIDES (WILLIAM G.).	





JAWS AND TEETH OF CATS.

PROCEEDINGS

OF

THE ROYAL IRISH ACADEMY

PAPERS READ BEFORE THE ACADEMY

I.

ON THE FORMER OCCURRENCE OF THE AFRICAN WILD
CAT (*FELIS OCREATA*, GMEL.) IN IRELAND.

By R. F. SCHARFF, M.R.I.A.

(PLATE I.)

Read NOVEMBER 30. Ordered for publication DECEMBER 4, 1905. Published
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AFTER having made exhaustive inquiries in various parts of the country as to the occurrence of the Wild Cat in Ireland, the late William Thompson came to the conclusion (p. 11) that this species could not be given with certainty as a native animal. Nevertheless, he was informed that Wild Cats existed formerly in the West of Ireland, and he refers to a large cat which was shot in a wild state at Shane's Castle park, County Antrim. This resembled *Felis catus*, according to his description, in everything except the form of the tail. It appeared to him to be a genuine hybrid between *Felis catus* and the Domestic Cat (p. 12)—an admission on his part that he believed in the existence of the true Wild Cat in this country.

A more interesting historical reference to the former existence of the Wild Cat in Ireland occurs in an ancient Irish poem. The manuscript poem, which is preserved in the Royal Irish Academy, was translated by Mr. Eugene O'Curry, and published by Sir William Wilde. The original is believed to be as old as the ninth century; and, as Sir William Wilde expresses it, it is certainly one of the most remarkable productions of its kind known in any language in Europe of the same date. The history of the poem is as follows:—Fin mac Cumhail was made prisoner by Cormac mac Art, monarch of Erin, who consented to liberate him on the condition that a male and

female of every species of wild animal in Ireland were brought to him at the ancient city of Tara. The result of Mac Cumhaill's mission, which was successfully accomplished, is described in this poem. Reference is made to a large number of wild mammals and birds. Among them are some names of which the meaning is still unknown. But of particular interest is the allusion to two cats which were brought from the cave of Cruachain (p. 191) as ransom to Cormac, indicating that Wild Cats were then known to exist in Ireland.

At a meeting of the Dublin Natural History Society,¹ Mr. William Andrews stated that he had every reason to believe that the true Wild Cat was at one time well known in the remote glens of the western parts of Kerry. The Marten, he says, was called 'Cac Crann' ('Tree Cat') in Kerry; the Wild Cat was known as 'Cac Fiaðac' ('Hunting Cat').

In the year 1885 Mr. W. B. Tegetmeier exhibited a specimen of a cat before the London Zoological Society which had been obtained in Donegal, and which he referred to as the Wild Cat (*Felis catus*). Dr. E. Hamilton, however, showed subsequently (p. 211) that this specimen was not *Felis catus*, the difference in the tail and feet being very distinct. He concluded that it was the offspring of a Domestic Cat which had run wild, and bred in the woods and mountains of the district.

As I shall demonstrate in the following pages, there can be no doubt that a Wild Cat did exist in comparatively recent times in Ireland. That Wild Cat was not identical with the European Wild Cat (*Felis catus*), but with the African, which has not a bushy tail. It is possible, therefore, that the cat obtained in Donegal may have been one of the last survivors of the genuine Irish Wild Cat. Indeed, Mr. F. C. Wallace assures me that he saw a magnificent Wild Cat near Annaghdown, County Galway, about 1883, when rabbit-shooting. I ventured to express a hope in the *Irish Naturalist* that renewed efforts might be made to ascertain whether some member of the Wild Cat tribe may not be lingering on at present in the more remote regions of the West. Mr. Robert Warren held out little hope that such efforts would be successful; while my note elicited some interesting historical evidences as to the former existence of the Wild Cat in Ireland (cf. *Irish Naturalist*, 1905) from Mr. W. F. de V. Kane and Mr. R. Welch.

When Dr. Forsyth Major was engaged in examining the collection of fossil Mammalia in our National Museum some years ago, he

¹ Cf. Proc. Dub. Nat. Hist. Soc., vol., i. p. 69.

discovered an ulna from Ballinamintra cave which he pronounced to be that of a Wild Cat. I subsequently sent a drawing of this ulna to Professor Nehring, of Berlin, who possessed a very large collection of skeletons of Wild Cats, and who was a recognised authority on mammalian osteology. (We have to deplore his untimely death, which occurred last winter.) All he could say was that the ulna was not that of a Domestic Cat, nor could he identify it with the ulnæ of the German Wild Cats in his collection. This left the matter of the former occurrence of the Wild Cat in Ireland somewhat in doubt, until I had an opportunity of examining the large collection of cat remains brought to light through Mr. Ussher's successful explorations of the Edenvale and Newhall caves, near Ennis, in County Clare.

In examining a number of jaw fragments of cats, and single teeth from these caves, I was struck by the great size of some of the lower carnassial, or molar teeth. Many of the individuals to whom these teeth belonged were evidently Domestic Cats which had strayed and had died in the caves in recent times, or whose remains had been dragged there by other carnivores. A few, however, seemed to belong to another species, and I determined to make a very careful comparison with all the available material of cats in the Dublin Museum. I also transported all the cave remains of cats to the British Museum, where, with Mr. Oldfield Thomas' kind permission, I was enabled to compare them with the large series of cat skulls in his charge. I likewise compared the Irish remains with those of the fossil English Wild Cat remains in the British Museum, Dr. Smith Woodward kindly granting me every possible facility for doing so. And, finally, I examined and measured the well-known jaw of a Wild Cat which is in the charge of Professor Sollas at Oxford, who gladly placed the specimen at my disposal. I have thus had opportunities for handling and critically comparing a large series of the teeth of various species of cats, both fossil and recent.

In the following table I give the measurements of the lengths of the lower carnassial teeth of Domestic Cats. In order that there should be no doubt as to the exact position where the length of the tooth was measured, I herewith indicate the line of measurement by a dotted line on a figure representing a carnassial tooth:—



FIG. 1.—Lower Carnassial Tooth of Cat, showing line of measurement.

DOMESTIC CAT (*Felis domestica*).

LOCALITY AND MUSEUM REGISTER.				Sex.	Carnassial.	Carnassial to canine.	Carnassial to 1st premolar.	Upper Carnassial.	REMARKS.
Recent in Dublin Museum.	London, ..	43.	1905	♂	m.m. 7 $\frac{1}{2}$	m.m. 32	m.m. 20 $\frac{1}{2}$	m.m. 10 $\frac{1}{2}$	
	White-park Bay, Co. Antrim,	275.	1902	—	6 $\frac{1}{2}$	27	18	10	
	loc. (?) (probably Irish), ..	79.	1902	—	6 $\frac{1}{2}$	28	18	10	
	Dundrum, Co. Dublin, ..	—	—	♂	7	33 $\frac{1}{2}$	20	10	
	Cappagh, Co. Waterford, ..	107.	1902	—	6 $\frac{1}{2}$	30 $\frac{1}{2}$	20	10 $\frac{1}{2}$	
	Shot wild at Glenarm, Co. Antrim, ..	210.	1905	—	6 $\frac{1}{2}$	29 $\frac{1}{2}$	18	10	
	Shot wild at Greystones, Co. Wicklow }	171.	1896	♂	8	35 $\frac{1}{2}$	21 $\frac{1}{2}$	abt. 11	Broken.
Fossil in Dublin Museum.	Edenvale Caves, ..	E. A. 30.	—	—	7	—	19	—	
	" ..	E. C. 230.	—	—	7	29 $\frac{1}{2}$	19	10	
	" ..	E. C. 93.	—	—	7	27 $\frac{1}{2}$	18	—	
	" ..	E. C. 230.	—	—	7 $\frac{1}{2}$	30	19	10 $\frac{1}{2}$	
	" ..	E. C. 318.	—	—	7	29	19	—	
	" ..	E. C. 87.	—	—	7	—	18	—	
	" ..	E. C. 58.	—	—	6 $\frac{1}{2}$	—	18	—	
" ..	E. C. 79.	—	—	7	—	18	—		
Fossil in Dublin Museum.	Newhall Caves, ..	N. H. 84.	—	—	8	34	21	—	
	" ..	N. H. 118.	—	—	8	32 $\frac{1}{2}$	22 $\frac{1}{2}$	—	
	" ..	N. H. 156.	—	—	8	—	21 $\frac{1}{2}$	—	
	" ..	N. H. 102.	—	—	8	32	20	11	Whole skull preserved.
	" ..	N. H. 93.	—	—	7 $\frac{1}{2}$	28	19	—	
	" ..	N. H. 23.	—	—	7 $\frac{1}{2}$	31	20 $\frac{1}{2}$	—	
	" ..	N. H. 29.	—	—	7 $\frac{1}{2}$	30 $\frac{1}{2}$	20	—	
	" ..	N. H. 2.	—	—	7	29 $\frac{1}{2}$	20 $\frac{1}{2}$	—	
	" ..	N. H. 1.	—	—	7	27 $\frac{1}{2}$	18	—	
	" ..	N. H. 85.	—	—	6 $\frac{1}{2}$	—	17 $\frac{1}{2}$	—	
	" ..	N. H. 102.	—	—	5 $\frac{1}{2}$	24 $\frac{1}{2}$	16 $\frac{1}{2}$	—	
	" ..	N. H. 102.	—	—	6 $\frac{1}{2}$	26	17 $\frac{1}{2}$	—	
	Barn tick Cave, ..	C. B. 7.	—	—	7	27 $\frac{1}{2}$	19 $\frac{1}{2}$	—	
	" ..	C. B. 2.	—	—	7	27	18	—	
" ..	C. B. 6.	—	—	7	27	18	—		
" ..	C. B. 11.	—	—	6 $\frac{1}{2}$	28 $\frac{1}{2}$	18	—		
" ..	C. B. 2.	—	—	6 $\frac{1}{2}$	27	19	—		
" ..	C. B. 5.	—	—	6	26 $\frac{1}{2}$	17	—		
Recent in Brit. Mus.	England, ..	127. f.	—	—	6 $\frac{1}{2}$	27	18	10	
	" (tailless var.)	45. 3. 17. 10.	—	—	6 $\frac{1}{2}$	30 $\frac{1}{2}$	19	10	
	" ..	41. 7. 14. 46.	—	—	7	26 $\frac{1}{2}$	18	10 $\frac{1}{2}$	
	" ..	46. 3. 18. 8.	—	—	8	35 $\frac{1}{2}$	22	12	
Fossil in Brit. Mus.	Gower Caves, ..	M. 95.	—	—	8	30 $\frac{1}{2}$	21	—	
	" ..	M. 96.	—	—	6 $\frac{1}{2}$	29 $\frac{1}{2}$	18	—	

The distances from the anterior edge of the socket which contained the canine tooth to the posterior edge of the carnassial tooth-socket were, likewise, measured; also from the latter to the anterior edge of the first premolar socket, so as to be able to compare the size of the carnassial with the length of the jaw. I also indicate the length of the upper carnassial, measured along its outer edge. The lower carnassial tooth (Plate I., fig. 1) forms a particularly suitable object for discriminating the various species of cats from one another; and as the lower jaws, and with them that tooth, are frequently preserved in caves, we possess ample material for comparison, and are thus able to trace the range of the species in past times. It will be noticed from the above table that the length of the lower carnassial in the majority of recent Domestic Cats varies between $6\frac{1}{2}$ and $7\frac{1}{2}$ mill. Only in two cases did this tooth reach a length of 8 mill., and both of these were probably old males. They were of powerful dimensions, the skull being quite as large as an average-sized African Wild Cat. One of these was shot as a Wild Cat in the County Wicklow. It may have been a descendant of a true Wild Cat which had interbred with the domestic form. In the Gower caves of England, and in Ireland in the Newhall caves, similar specimens have been met with, which seem to form a link between the Domestic Cat and the larger African Wild Cat, in so far as the size of the lower carnassial is concerned. The Domestic Cat may possibly have developed quite independently from the Wild Cat in Ireland, and these intermediate stages may be the links connecting the later undoubted cave-remains of Domestic Cats with the older ones of the genuine Wild Cat. I had only few opportunities of examining the upper carnassial teeth in fossil cats, as the skull is very rarely preserved in caves; but that tooth in the two large recent cats referred to was equal in size to that of some of the smaller Wild Cats. The length of the upper carnassial in all the cats, both wild and domestic, ranged from 10 to $12\frac{1}{2}$ mill.; while the lower carnassial, a smaller tooth, showed difference in size ranging from $5\frac{1}{2}$ to 10 mill. The latter tooth has apparently been more affected by domestication than the upper carnassial. In all Domestic Cats it resembles in shape the same tooth in the Wild African or Caffer Cat (Plate I., fig. 7), being broad and low as compared with that of the European Wild Cat. In recent Domestic Cats the lower carnassial generally varies between $6\frac{1}{2}$ -8 mill. in length; but I have met with the remains of an extremely small race of cats in the Newhall and Bantick caves (Plate I., fig. 1). Their limb bones are about the size of the ordinary Marten (*Mustela martes*), and the

lower carnassial, in one case, only measured $5\frac{1}{2}$ mill. in length (N.H. 102).¹

When we compare the table containing the measurements of the Domestic Cat with those of the African Wild Cat, which is often referred to as the Caffer or Egyptian Cat, the most striking differences in size will be noticed in the lower carnassial tooth. The cave specimens of cats whose lower carnassial did not exceed 8 m.m. in width were placed among the Domestic Cats. Specimens in which the lower carnassial measured $8\frac{1}{2}$ m.m. and more in length, must be looked upon as belonging to the larger African Cat. This slight difference in size may seem a trivial character; but the jaws, with a carnassial of $8\frac{1}{2}$ m.m. and more, were indistinguishable from those of the African Wild Cat. The recent cat jaws from southern Europe and Africa, which belong to our own Museum, and those which I measured in the British Museum, were undoubtedly those of Wild Cats of the same species. I have indicated the sizes of their carnassial teeth and some other measurements, which seemed to me useful for comparison.

The shape of the lower carnassial tooth in the genus *Felis* is subject to slight variation, and the jaws of the various species are recognised principally by the size of that tooth. As the African Wild Cat has a slightly larger lower carnassial than the Domestic Cat, so in the Serval Cat, the Lynx, the Panther, and finally in the Lion and Tiger, the same tooth assumes gradually larger and larger dimensions, though retaining a very similar shape. From the presence in the upper layers in some of the Irish caves of cat remains with large lower carnassial teeth, we can conclude therefore that a Wild Cat inhabited Ireland at the time when these deposits were laid down. That these are quite recent is proved by the fact that they contain human remains as well as those of various species of domestic animals.

It will be noticed from the table of measurements that I have included two instances of the supposed fossil occurrence in England of the European Wild Cat, under the heading of the African Cat. These are two well-known jaws of cats, one of which is in the British Museum, and the other in the Oxford Museum, both of them having been discovered in Kent's Hole, near Torquay. The first of these, which has been figured by Dr. Hamilton (p. 7, fig. 2), was referred to as the European Wild Cat (*Felis catus*) by Owen (p. 173) in his

¹ This indicates the Dublin Museum register number of the specimen.

SCHARFF—Former Occurrence of African Wild Cat in Ireland. 7

AFRICAN WILD CAT (*Felis ocreata*, Gmel.).

LOCALITY AND MUSEUM REGISTER.				Sex.	Lower carnassial.	Lower carnassial to canine.	Carnassial to 1st premolar.	Upper carnassial.	REMARKS.
					m.m.	m.m.	m.m.	m.m.	
Recent in Dublin Museum.	{	Sardinia,	76. 1901	♂	9	30	20½	12	
		„	278. 1902	♀	8½	29½	20	11	
		Abyssinia,	549. 1904	—	8½	32	21½	11½	
Recent in British Museum.	{	Sardinia,	88. 12. 1. 1.	♂	9	34	22½	12½	
		Deelfontein (Cape), ..	2. 12. 1. 1.	♂	9	36½	24½	12½	
		„ „ ..	2. 12. 1. 3	♀	8½	35	22½	11	
		„ „ ..	2. 12. 1. 2	♂	9	37	24	12½	
		S. Africa, „ ..	857. a	—	9	38½	24	12½	
		Andalusia, „ ..	2. 6. 3. 2.	♂	9	37	23	12	
„	2. 6. 3. 3.	♀	9½	34½	24	12½			
Fossil in Dublin Museum.	{	Edenvale Caves, ..	E. A. 42	—	9	32	22½	—	
		„ „ ..	E. C. 361	—	—	—	—	11	Upper jaw fragment.
		„ „ ..	E. C. 310	—	8½	—	22	—	
		Newhall Caves, ..	N. H. 88	—	10	36	24½	—	
		„ „ ..	N. H. 118	—	8½	32½	22	—	
		„ „ ..	N. H. 88	—	8½	32½	22	—	
		„ „ ..	N. H. 85	—	8½	—	21½	—	
„ „ ..	N. H. 23	—	8½	33	22	—			
„ „ ..	N. H. 93	—	—	—	—	—	12	Upper jaw fragment.	
Fossil in British Museum.	{	Kent's Hole, Torquay,	167. 10	—	8½	33½	22½	—	
		Gibraltar Caves, ..	—	—	9½	—	21	—	
		„ „ ..	—	—	—	36	24	—	
		Happaway Cave, England,	M. 5830	—	—	—	—	12½	Upper jaw fragment.
Oxford Mus.	{	Kent's Hole, Torquay,	—	—	8½	32½	—	—	

article on the Wild Cat. I have not been able to measure the jaw from the brick earth of Gray's, figured by him; but the Kent's Hole jaw is almost identical with one of the jaws from the Newhall caves in Ireland, and agrees also with the jaw of the African Cat, with which Owen had perhaps omitted to compare it. Especially are these resemblances to be seen in the cave carnassial, which is slightly different in shape in the European Wild Cat from that in the African Wild Cat. I have no hesitation in also referring the Oxford specimen to the African Cat. An upper jaw fragment in the British Museum from Happaway cave, with a large upper carnassial, which has not yet been described, was pointed out to me by Dr. Andrews. He informs me that he had identified it as *Felis caligata*, which is one of the numerous synonyms for the African Wild Cat. I have therefore included it in the above table of measurements. I have also included in this table of measurements the two mandibles from the caves of Gibraltar, described and figured by Busk. In only one of them is the lower carnassial complete. It is $9\frac{1}{2}$ m.m. long, and therefore not quite as large as that in the splendid jaw from Newhall caves (N.H. 88), of which I give an illustration (Plate I., fig. 2).

When studying these cave remains of cats, I had also an opportunity of comparing them with the jaw of an Egyptian mummy cat in the Dublin Museum (Plate I., fig. 4), which the larger Irish specimens closely resemble. It is interesting to note that no traces of domestication were visible in the teeth of the mummy cat. This seemed to me to indicate that this species led a semi-feral existence at the time when it was the custom in Egypt to preserve and mummify cats. But Dr. Forsyth Major kindly drew my attention to a work in the British Museum Library, which gives the results of a most exhaustive study on this interesting subject by Messrs. Lortet and Gaillard. The authors critically examined fifty skulls of mummy cats, and found that two series were distinguishable (p. 23), viz., a large form exactly like the present African Wild Cat, and a smaller one resembling our own Domestic Cat. The latter, however, was more closely related to the wild species than is our Domestic Cat, and it was much rarer than the larger form. Various stages of face reduction seem to be traceable in these mummy cats.

Messrs. Lortet and Gaillard are of opinion that our Domestic Cat has originated from two wild Egyptian species of cat. A similar opinion, at least, that our Domestic Cat is a descendant of the African, rather than of the European Wild Cat, has already been expressed by Prof. Nehring (p. 27), while Mr. Lydekker (p. 157)

holds that the African Wild Cat was probably the chief ancestral stock of our European domesticated breed.

The domesticated cats of Europe have probably, to some extent, descended from the European Wild Cat (*Felis catus*), which seems to be an eastern species. The domestic cat of India has in a similar way originated, in all probability, from one of the desert cats of India, and certainly within recent times much intercrossing has taken place, impairing the purity of the domestic race. As far as Ireland is concerned the great majority of Domestic Cats that I have examined seem to me to have had for their ancestor only one species, viz., the African Wild Cat, from which it may have developed, as I remarked before, quite independently in Ireland itself.

To Prof. Boyd Dawkins and Mr. Sandford belongs the credit of having first recognised the occurrence in British cave deposits of the African Wild Cat. They first noticed the agreement of the jaw from Bleadon cave (p. 182) with that of what they call *Felis caffer*, which again is one of the numerous synonyms of *Felis ocreata*. They do not seem to have made a special study of the lower carnassial, yet there can be no doubt that the Bleadon jaw (plate 24, fig. 6) agrees in every particular with the jaws of the Wild Cats I have described from the Irish caves.

It seems to me that the jaw fragment of *Felis* sp. indet., described by Prof. Depéret from the Pliocene deposits of south-western France, belongs also to the African Wild Cat.

There still remains for me to make a few remarks on the nomenclature adopted in this paper. In the final Report issued by the Irish Cave Committee to the British Association in 1904, I had used the term *Felis caligata* for the Irish Wild Cat, which I considered of the same species as the larger African Wild Cat. But I have now convinced myself that *Felis caligata*, *Felis maniculata*, *Felis caffer*, and a good many other names which have been given to African Wild Cats, are really synonyms. In the dilemma which of these names to adopt for the Irish Wild Cat, Mr. Oldfield Thomas kindly drew my attention to a paper by Mr. Schwann, in which he showed—and Mr. Thomas quite agrees with his views—that the oldest name is *Felis ocreata*. I have, therefore, adopted this name, which was given to the African Wild Cat by Gmelin in 1791, and so has priority over *Felis caligata* and others, which are more recent.

EUROPEAN WILD CAT (*Felis catus*).

LOCALITY AND MUSEUM REGISTER.		Sex.	Lower Carnassial.	Carnassial to canine.	Carnassial to 1st premolar.	Upper Carnassial.
Recent in Dublin Museum.	Inverness, Scotland, .. 170. 1899	♂	m.m. 8	m.m. 33	m.m. 21½	m.m. 10½
	Germany, .. 322. 1904	—	8½	36	23	11½
Recent in British Museum.	Fort William, Scotland, 99. 2. 9. 1	—	7½	32½	21	10½
	Inverness, Scotland, 98. 12. 26. 1	♂	8	33½	22	11
	„ „ 4. 1. 25. 5	♀	7½	31	20	10
	„ „ 4. 1. 25. 3	♂	7½	33	22	10½
	Caucasus, 79. 11. 15. 4. —	—	8½	34½	22	11½
	Baranza, Hungary, 2. 6. 3. 1	♂	8	35½	22	11½
Manonville, France, 95. 11. 9. 1	♂	8	33	21	11½	

It will be seen from this table of measurements of the jaws of the European Wild Cat that, although the latter are of about the same size as those of its African relative, the length of the lower carnassial is often equal, and rarely exceeds that of the Domestic Cat. It is almost always much shorter than that of the African Cat. But the carnassial makes up in height for what it lacks in length, and it is, as a rule, more square-shaped (Plate I., fig. 5) than that of the African Cat. That it has not always this peculiar shape is probably due to the fact that we frequently find in museums skulls which belong to half-breeds. We do not know whether the African and the European Wild Cats interbreed. They probably do so, and it is certain that the latter frequently cross with Domestic Cats, so that it is not easy to obtain pure-bred specimens now.

Among the specimens examined at the British Museum, the one from the Caucasus had a lower carnassial of an intermediate type, also those from Hungary and France. Nevertheless, they were sufficiently distinct from African and cave types to be readily separable.

In conclusion, I should like to express my special thanks to the British Association, and to the Royal Irish Academy Fauna and Flora Committee, without whose help the valuable cave researches could not have been undertaken, and also to Mr. R. J. Ussher, and to the owners of the Edenvale, Newhall, and Barntick Caves, without whose conspicuous services the cat remains would probably never have been brought to light.

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DESCRIPTION OF PLATE I.

Fig.

1. Right ramus of lower jaw of dwarf form of Domestic Cat (*Felis domestica*), from Newhall caves. (N. H. 102.) × 1.
2. Right ramus of lower jaw of African Wild Cat (*Felis ocreata*), from Newhall caves. (N. H. 88.) × 1.
3. Right ramus of lower jaw of European Wild Cat (*Felis catus*), from Inverness, Scotland. (107. 1899.) × 1.
4. Right ramus of lower jaw of African Mummy Cat (*Felis ocreata*), from Egyptian tomb. (72. 1901.) × 1.
5. Lower carnassial tooth of European Wild Cat (*Felis catus*), from Inverness, Scotland. × 2.
6. Lower carnassial tooth of Domestic Cat (*Felis domestica*), from Cappagh, Co. Waterford. × 2.
7. Lower carnassial tooth of African Wild Cat (*Felis ocreata*), from Newhall caves. × 2.

NOTE.—The roots of the teeth in figs. 6 and 7 should be twisted more to the right in order to give an exact idea of their position in the alveoli.

II.

IRISH TOPOGRAPHICAL BOTANY: SUPPLEMENT,
1901-1905.

BY ROBERT LLOYD PRAEGER.

Read FEBRUARY 12. Ordered for Publication FEBRUARY 14.
Published MARCH 10, 1906.

In the year 1901, the Academy did me the honour of publishing my "Irish Topographical Botany," in which the distribution of Flowering Plants and Higher Cryptogams in Ireland was shown according to forty geographical divisions, consisting of counties or portions of counties. The result of the publication of this work was to give a marked stimulus to the working out of the range of plants in this country; and our knowledge of botanical geography has advanced rapidly during the succeeding years. Each year I have summarized the results of the preceding season's work in *The Irish Naturalist*. Now that five seasons have elapsed, and a large body of material has accumulated, publication of a summary of the results obtained appears desirable.

To show the general advance in our knowledge of plant-distribution in Ireland, it may be mentioned at once that the net total number of species and sub-species to be now added to the county lists is 814. Also that, whereas at the end of 1900 the average number of aggregate species recorded from the forty divisions was 628, it has risen at the end of 1905 to 646. The additions now made involve an extension of range for nearly every second plant out of some 700 not set down in 1900 as already known to occur in all forty divisions. This gain of course has not been equally shared by all parts of the country. In one division—namely, East Mayo—no addition to the flora has been recorded; while at the other end of the line, Limerick heads the list with 104 additional species and sub-species. The areas in which the most marked progress has been made may be briefly mentioned as under:—

1 and 2. KERRY. A number of valuable additions have resulted from the continuance of Dr. Scully's researches into the flora.

8. LIMERICK. Miss Knowles and Miss O'Brien, working at the Barony of Shanid, have made great additions to the flora; Miss Armitage and R. A. Phillips have also materially contributed.

9. CLARE. R. A. Phillips and the writer are mainly responsible for a long list of additions to the already large flora of this interesting county.

19. KILDARE. Miss Knowles' examination of the herbarium of John Douglas, formed in 1864-5, has supplied an important contribution to the flora of this county.

22. MEATH. W. A. Barnes and myself are chiefly responsible for a good list of new plants.

23. WESTMEATH. Miss Reynell is the principal contributor to the list of plants new to this county.

27, 28, 29, 30, 32, 33, 38. MAYO W., SLIGO, LEITRIM, CAVAN, MONAGHAN, FERMANAGH, DOWN. The flora of all these divisions has been considerably added to, mainly through my own work.

The following list shows the number of species (aggregates)¹ known to occur in each division in 1901, the additions made during 1901-1905, and the present total flora of each division. From this we may see the advance made during the five years in our knowledge of plant-distribution in Ireland, and the comparative richness, as at present known, of the different parts of the country.

1. Kerry South,	680	+	26	=	706
2. Kerry North,	705	+	31	=	736
3. Cork West,	705	+	5	=	710
4. Cork Mid,	672	+	3	=	675
5. Cork East,	700	+	4	=	704
6. Waterford,	663	+	6	=	669
7. Tipperary S.,	594	+	11	=	605
8. Limerick,	623	+	84	=	707
9. Clare,	712	+	46	=	758
10. Tipperary N.,	576	+	11	=	587
11. Kilkenny,	616	+	9	=	625
12. Wexford,	689	+	5	=	694
13. Carlow,	578	+	2	=	580

¹ That is, those species which are printed in heavy type in "Irish Topographical Botany." This gives a conservative estimate of the flora, the fruticose *Rubi*, the hypnoid Saxifrages, and other groups of segregates ranking as one species each group.

14. Queen's County, . . .	582	+	8	=	590
15. Galway S.E., . . .	662	+	2	=	664
16. Galway W., . . .	665	+	9	=	674
17. Galway N.E., . . .	608	+	7	=	615
18. King's County, . . .	554	+	9	=	563
19. Kildare, . . .	561	+	27	=	588
20. Wicklow, . . .	720	+	6	=	726
21. Dublin, . . .	750	+	16	=	766
22. Meath, . . .	612	+	28	=	640
23. Westmeath, . . .	572	+	27	=	599
24. Longford, . . .	544	+	5	=	549
25. Roscommon, . . .	544	+	9	=	553
26. Mayo East, . . .	572	+	0	=	572
27. Mayo West, . . .	601	+	40	=	641
28. Sligo, . . .	606	+	48	=	654
29. Leitrim, . . .	533	+	31	=	564
30. Cavan, . . .	500	+	49	=	549
31. Louth, . . .	641	+	9	=	650
32. Monaghan, . . .	477	+	46	=	523
33. Fermanagh, . . .	540	+	50	=	590
34. Donegal E., . . .	684	+	2	=	686
35. Donegal W., . . .	680	+	1	=	681
36. Tyrone, . . .	569	+	13	=	582
37. Armagh, . . .	631	+	2	=	633
38. Down, . . .	742	+	27	=	769
39. Antrim, . . .	777	+	8	=	785
40. Londonderry, . . .	702	+	1	=	703

Twenty-four plants which, according to the standard adopted in "Irish Topographical Botany," rank as species or sub-species, have to be added to the Irish list. These are mostly critical forms, and include seven Brambles and six Hawkweeds. Three of the additions, namely, *Rubus Lettii*, *R. dunensis*, and *Hieracium Scullyi*, are plants newly described from Irish material, and not yet recorded elsewhere. Another, *Fumaria purpurea*, is also a new plant, detected in both Great Britain and Ireland. *Glyceria festucaformis* is a Mediterranean grass as yet unknown in Great Britain; while *G. Foucaudi* and *Nitella mucronata*, now recorded from Ireland, are of extreme rarity in the sister island. Three aliens—*Lepidium Draba*, *Valerianella carinata*, and *Tragopogon porrifolius*—are now admitted, as being fully naturalized in more than one district; while another, *Matricaria*

occidentalis, is accorded sub-specific rank under *M. discoidea*. The full list of species or sub-species added to the Irish flora is given below:—

PLANTS ADDED TO THE FLORA.

- Fumaria purpurea*.—A new species established by H. W. Pugsley, and widely spread in Ireland.
- **Lepidium Draba*.—An alien from S.E. Europe and W. Asia, now established in several Irish counties.
- Rubus Lettii*.—A lately described plant, found in Down and Armagh by H. W. Lett and C. H. Waddell.
- R. criniger*.—Found in Clare in 1905 by R. A. Phillips. Ranks as new, the former Down record having been withdrawn (see p. 18).
- R. dunensis*.—A lately described plant found abundantly in Down and Armagh by Messrs. Rogers, Lett, and Waddell, and in West Mayo by myself.
- R. podophyllus*.—One of Dr. Scully's North Kerry brambles, 1903.
- R. mutabilis*.—Found in North Kerry by G. C. Druce, and in Down by W. M. Rogers, both in 1901.
- R. longithyriger*.—Found (in the var. *botryeros*) by myself in Fermanagh, and by R. A. Phillips in East Cork.
- R. serpens*.—Found by R. W. Scully in North Kerry in 1903.
- Rosa obtusifolia*.—Found in Limerick by R. A. Phillips in 1905.
- **Valerianella carinata*.—Now admitted to the flora, as being fully established in more than one locality.
- **Matricaria occidentalis*.—Admitted as deserving sub-specific rank; in *I.T.B.* included under *M. discoidea*.
- Arctium Newbouldii*.—Apparently a distinct Burdock. Not uncommon in Ireland.
- Hieracium pachyphyllum*.—Raised to specific rank in Linton's "British Hieracia." Previously included under *H. vulgatum*.
- H. crebridens*.—Recorded from Clare in Williams' "Prodromus Floræ Britannicæ."
- H. rivale*.—Found in the Mourne Mountains by myself in 1890, but only recently named.
- H. Orarium*.—Found in West Mayo by myself in 1900, and in Antrim by S. A. Stewart.
- H. Scullyi*.—A South Kerry plant of R. W. Scully's, newly described in Linton's "British Hieracia."
- H. stictophyllum*.—Collected in West Donegal by F. J. Hanbury in 1891. Recently recorded in Linton's "British Hieracia."

**Tragopogon porrifolius*.—Now admitted to the Irish list, as being fully established in several districts.

Carex irrigua.—Found by Miss Eleanor D'Arcy in Co. Antrim in 1901.

Glyceria festucaeformis.—Found in Strangford Lough by myself in 1903, and now shown to be widely spread on the Co. Down shores.

G. Foucaudi.—Found in Limerick by Miss Knowles in 1903.

Nitella mucronata.—Found in Monaghan in 1901 by Rev. G. R. Bullock-Webster.

Of equal or greater importance are certain extensions of the range of well-marked species, of limited distribution in Great Britain, or Ireland, or both, which have been recorded during the last five years. Some of the more interesting of these are noted below.

SOME NOTABLE EXTENSIONS OF RANGE.

<i>Species.</i>	<i>Range as formerly known.</i>	<i>Extension.</i>
<i>Ranunculus scoticus</i> ,	W. Mayo,	Fermanagh.
<i>Cochlearia grænlandica</i> ,	W. Donegal,	W. Mayo.
<i>Teesdalia nudicaulis</i> ,	Tyrone,	N. Kerry, Down.
<i>Silene acaulis</i> ,	Ben Bulbin,	W. Mayo.
	E. Donegal, Derry,	
<i>Rosa hibernica</i> ,	Antrim, Down,	Limerick.
	Derry,	
<i>Saxifraga decipiens</i> ,	Kerry,	W. Mayo.
* <i>Valerianella carinata</i> ,	Down,	N. Kerry.
<i>Epilobium angustifolium</i> ,	Ulster, Leitrim,	W. Mayo.
	Wicklow,	
<i>Pyrola secunda</i> ,	Antrim, Derry,	Fermanagh.
<i>Euphrasia Salisburgensis</i> ,	W. coast, Limerick	Sligo, Fermanagh.
	to Leitrim,	
<i>Pinguicula grandiflora</i> ,	Cork and Kerry,	Clare.
<i>Polygonum mite</i> ,	Leitrim, Cavan,	Limerick.
	L. Neagh,	
<i>Spiranthes Romanzoffiana</i> ,	W. Cork, Armagh,	Antrim.
	Derry,	
<i>Sisyrinchium angustifolium</i> ,	Kerry, Cork, Clare,	Sligo, Fermanagh.
	Galway,	
‡ <i>Juncus tenuis</i> ,	Kerry, W. Cork,	Down.
	Clare,	
<i>Brachypodium pinnatum</i> ,	Waterford,	W. Cork.
<i>Equisetum pratense</i> ,	Donegal, Antrim,	Fermanagh.

On the other side of the account, certain records have to be withdrawn, but these are fortunately few in number. Of four names withdrawn for the present from the Irish list, three are critical plants apparently misnamed, and the fourth a critical plant which the latest authority has treated as a variety only.

PLANTS WITHDRAWN.

- Fumaria muralis*, . . . apparently all records are incorrect—P.,¹
I. N., xiv. 162.
- Rubus gratus*, . . . records transferred to *R. Selmeri*—W. M.
Rogers, *I. N.*, x. 215.
- R. pubescens* . . . is doubtful—W. M. Rogers, *I. N.*, x. 215.
- Hieracium cerinthiforme* ranks as a variety—W. R. Linton, "Account
of the British Hieracia."

In addition, *Rubus criniger* was withdrawn, but simultaneously restored by the finding of the true plant elsewhere (R. A. Phillips, *I. N.*, xiv. 7).

Some division-records have to be withdrawn likewise; but these again lie mostly among the critical genera *Fumaria*, *Rubus*, and *Hieracium*. They are listed below; and the reasons for their withdrawal are added.

DIVISION-RECORDS WITHDRAWN.

<i>Name.</i>	<i>Divisions withdrawn.</i>	<i>Reason.</i>
<i>Fumaria Boræi</i> , . . .	17, 18, 20, 24, 25, 28, 31,	} See <i>I. N.</i> , xiv. 156-163.
<i>F. confusa</i> , . . .	7, 11, 30.	
<i>F. officinalis</i> , . . .	13.	
<i>Arenaria trinervis</i> ,	27.	Belongs to 26.—P., <i>I. N.</i> , xiv. 28.
<i>Rubus silvaticus</i> , . . .	38.	Doubtful—W. M. Rogers, <i>I. N.</i> , x. 215.
<i>R. rudis</i> ,	38.	Is <i>R. radula echinitoides</i> —W. M. Rogers, <i>I. N.</i> , x. 219.
<i>R. Chamæmoris</i> , . . .	40.	Belongs to 36—Vowell and Barrington, <i>I. N.</i> , xii. 317.
<i>Valeriana Mikanii</i> ,	1, 2.	Is not true <i>Mikanii</i> —R. W. Scully, <i>I. N.</i> , xiii. 78.
<i>Hieracium vulgatum</i> ,	2.	Is <i>H. orimeles</i> —R. W. Scully, <i>I. N.</i> , xiii. 79.

¹ As in "Irish Top. Bot.," the initial P. stands for my own name.

<i>Name.</i>	<i>Divisions withdrawn.</i>	<i>Reason.</i>
H. gothicum,	1.	Is <i>H. sparsifolium</i> —R. W. Scully, <i>I. N.</i> , xiii. 79.
H. rigidum,	2.	Is <i>H. sparsifolium</i> —R. W. Scully, <i>I. N.</i> , xiii. 79.
H. boreale, . . .	1.	Is a new form (<i>H. Scullyi</i>)—R. W. Scully, <i>I. N.</i> , xiii. 79, and Linton's "Brit. Hieracia."
Butomus umbellatus,	30.	Belongs to 33—P., <i>I. N.</i> , xii. 35.

In addition, *Leucojum aestivum*, withdrawn from Limerick, was simultaneously restored (P., *I. N.*, xiv. 24); and a number of county-records of Fumitories have been withdrawn and replaced (P., *I. N.*, xiv. 156-163).

The present appears a suitable place for noting any *corrigenda* in "Irish Topographical Botany" which have been observed from time to time. I am glad to say that they are not very many in number, nor serious in their import.

CORRIGENDA IN "IRISH TOPOGRAPHICAL BOTANY."

- p. xxx. line 2. *For* stablemoss-grown *read* stable moss-grown.
 p. cxxiii. item 376. *For* II. *read* III.
 p. cxlvi. line 2. *For* Charles *read* Cosslett.
 p. cxlviii. *Anemone nemorosa.* *Add* 22.
 p. clxvi. *Carduus nutans.* *For* 26 *read* 27.
 p. clxxiv. *Salsola Kali.* *Add* 9, *delete* 10, *delete* 19, *add* 20.
 p. 3 *Thalictrum flavum.* *For* 16 *read* 17.
 p. 55 *Lychnis diurna.* *Under* 12 *add* rare.
 p. 57 *Cerastium semidecandrum.* *Under* 40, *for* Coast *read* Coast
and Lough Neagh, *and after last line add* and Dr. Moore's
Lough Neagh station.
 p. 82 *Trigonella ornithopodioides.* *For* 5 Cork E. *read* 4 Cork Mid.
 p. 93 *Prunus insititia.* *Under* 33, *for* House *read* Lane.
 p. 103 *Rubus hirtifolius.* *For* 10 *read* 16.
 p. 127 *Sedum Telephium.* *For* 1 *read* 2.
 p. 184 *Carduus nutans.* *For* 26 *read* 27.
 p. 187 *Cichorium Intybus.* *Under* 8, *withdraw* Longpavement,
which belongs to Clare.
 p. 195 *Hieracium vulgatum.* *Under* 14, *for* *inaculeatum read*
maculatum.
 p. 196 *Hieracium rigidum.* *Under* 35, *for* *glabrescens read*
scabrescens.

- p. 201 *Tragopogon pratensis*. *Read* Census 22—East 8, Centre 10, West 4.
- p. 241 *Orobanche Hederæ*. *Read* Census 24—East 9, Centre 5, West 10.
- p. 247 *Pinguicula lusitanica*. *Under* 12, for NE. *read* NW.
- p. 250 *Mentha Sativa*. *Read* Census 35—East 15, Centre 11, West 9.
- p. 262 *Lamium hybridum*. *Under* 38, *add* Not rare.
- p. 270 *Atriplex portulacoides*. *Read* Census 11 + (1)—East 9, Centre 0, West 2 + (1).
- p. 288 *Populus tremula*. *Read* Census 33—East 12, Centre 10, West 11.
- p. 290 *Elodea canadensis*. *Read* Census 36—East 15, Centre 13, West 8.
- p. 291 *Under* 34, for *Bundowes read* *Bundrowes*.
- p. 295 *Epipactis latifolia*. *Read* Census 30—East 12, Centre 9, West 9.
- p. 303 *Habenaria bifolia*. *Read* Census 37—East 12, Centre 13, West 12.
- p. 343 *Carex Hudsonii*. *Read* Census 33 + (1)—East 12 + (1), Centre 12, West 9.

I now proceed to list the new county records which have to be added to the floras of the forty divisions as enumerated in "Irish Topographical Botany." The list has been arranged in two forms. First, under the respective divisions; and in this first list, to each species is appended a contracted reference to the place of publication of the record. The vast majority of the new records have appeared in *The Irish Naturalist*; and where volume and page are quoted without a title prefixed, this Journal is indicated. Other references have been contracted as follows:—

- B.E.C. = Report of the Botanical Exchange Club.
 I.T.B. = Irish Topographical Botany.
 J.B. = Journal of Botany.
 J. & K. = Johnson & Knowles: The Levinge Herbarium. *Sci. Proc. R. Dublin Soc. (N.S.)*, x. 122–132, 1903.
 L.F.C. = *Journal* of the Limerick Field Club.
 W.B.E.C. = Report of the Watson Botanical Exchange Club.

An italic number (*e.g.* 874), quoted as a reference, refers to the Bibliography in "Irish Topographical Botany." A few recognizable contractions for the titles of books also occur.

NEW RECORDS, ARRANGED UNDER BOTANICAL DIVISIONS.

1. KERRY SOUTH.

- | | |
|--|---|
| Ranunculus Drouetii, xii. 113. | Rubus anglosaxonicus (raduloides), xiii. 130. |
| Fumaria purpurea, xii. 113. | regillus, xiii. 130. |
| Spergularia rubra, xi. 157. | Babingtonii, xiii. 130. |
| Rubus suberectus, xiii. 128. | Potentilla procumbens, xii. 114. |
| plicatus, xiii. 128. | Callitriche obtusangula, xii. 114. |
| nitidus (opacus), xiii. 128. | Galium erectum, ¹ xiii. 78. |
| affinis (Briggsianus), xiii. 129. | Hieracium argenteum, xiii. 78. |
| pulcherrimus, xii. 114. | orimeles, xiii. 79. |
| villicaulis (Selmeri and rhombifolius), xiii. 129. | Scullyi, Linton's Brit. Hier. |
| argentatus (robustus), xiii. 129. | sparsifolium, xiii. 79. |
| micans, xiii. 129. | *Cuscuta Trifolii, xii. 115. |
| iricus, xii. 114. | Atriplex hastata, xi. 158. |
| pyramidalis, xii. 114. | Orchis latifolia, xii. 115. |
| mucronatus, xiii. 129. | ‡Juncus glaucus, xi. 158. |
| | Bromus racemosus, xii. 116. |

2. KERRY NORTH.

- | | |
|-------------------------------------|---------------------------------------|
| Ranunculus heterophyllus, xii. 113. | Rubus pyramidalis, xiii. 129. |
| Fumaria purpurea, xii. 113. | anglosaxonicus, xiii. 130. |
| Cochlearia danica, xii. 114. | regillus, xiii. 130. |
| *Diploxys muralis, xii. 114. | podophyllus, xiii. 130. |
| Teesdalia nudicaulis, xi. 157. | mutabilis, x. 229. |
| Cerastium arvense, xi. 157. | fuscus, xiii. 130. |
| Rubus plicatus, x. 229. | serpens, xiii. 130. |
| cariensis, xiii. 129. | corylifolius (sublustris), xiii. 130. |
| pulcherrimus, x. 229. | Potentilla procumbens, xi. 157. |
| argentatus, xii. 114. | Œnanthe Phellandrium, xiii. 78. |
| micans, xiii. 129. | Galium erectum, xiii. 78. |
| iricus, xiii. 129. | |

¹ Dr. Scully believes this plant to be native in Kerry and West Cork (*Irish Naturalist*, xiii. 78.)

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|---|--|
| ‡Galium Mollugo, xi. 157. | Orchis latifolia, xii. 115. |
| *Valerianella carinata, xii. 114,
xiii. 4. | Ophrys apifera, xii. 115. |
| *Matricaria occidentalis, xii. 114. | Potamogeton plantagineus, xii.
115. |
| *Petasites fragrans, xi. 157. | *Bromus erectus, xi. 159. |
| *Crepis biennis, xii. 115. | * secalinus, xii. 116. |
| Hieracium orimeles, xiii. 79. | racemosus, xi. 159. |
| sparsifolium, xiii. 79. | * commutatus, xii. 116. |
| Centunculus minimus, xii. 115. | Equisetum trachydon, xii. 116. |
| Lithospermum officinale, xi. 158. | Pilularia globulifera, xi. 159. |
| Atriplex hastata, xi. 158. | Chara polyacantha, xii. 116. |
| *Salix pentandra, xiii. 80. | Tolypella glomerata, xii. 116. |

3. CORK WEST.

- | | |
|---------------------------------------|---|
| Rubus pulcherrimus, xii. 30. | Arctium Newbouldii, <i>I. T. B.</i> ,
and xiii. 3. |
| argentatus, xii. 30. | |
| Questierii, xii. 30. | ‡Cuscuta Trifolii, xii. 33. |
| Rosa glauca (subcristata), xv.
58. | Orchis latifolia, xii. 35. |
| ‡Anthemis Cotula, xii. 32. | Brachypodium pinnatum, xi.
219. |

4. CORK MID.

- | | |
|--------------------------------------|----------------------------------|
| Ranunculus heterophyllus, xv.
56. | *Matricaria discoidea, xiv. 223. |
| Fumaria Boræi, xii. 137. | Hieracium Schmidtii, xv. 59. |

5. CORK EAST.

- | | |
|---|---|
| Fumaria Boræi, xiii. 34. | *Matricaria discoidea, xiv. 223. |
| Rubus villicaulis (Selmeri),
xiv. 6. | ‡Crepis taraxacifolia, xii. 33. |
| mutabilis, xiv. 7. | *Tragopogon porrifolius, 595,
xiii. 4. |
| longithyriger (botryeros),
xiv. 7. | Atriplex littoralis, xiii. 118. |

6. WATERFORD.

- | | |
|-------------------------------|---------------------------------|
| Fumaria Boræi, xiii. 11. | Lamium intermedium, xii. 34. |
| Primula officinalis, xi. 5. | Phleum pratense, xii. 35. |
| Pinguicula vulgaris, xii. 34. | Ophioglossum vulgatum, xii. 36. |

7. TIPPERARY SOUTH.

- | | |
|---|-------------------------------------|
| Ranunculus sceleratus, xii. 29. | Myriophyllum spicatum, xii. 31. |
| Fumaria Boræi, xiii. 34. | |
| Brassica alba, xii. 29. | Bidens tripartita, xv. 58. |
| Cerastium tetrandrum, xii. 29. | Arctium minus, xii. 32. |
| *Hypericum hircinum, xv. 57. | Samolus Valerandi, xii. 33. |
| Erodium cicutarium, xii. 30. | Lemna polyrhiza, xv. 60. |
| Rubus corylifolius (cyclophyllus), xii. 31. | Potamogeton heterophyllus, xii. 35. |

8. LIMERICK.

- | | |
|---------------------------------------|--|
| Ranunculus circinatus, xv. 55. | Rubus villicaulis (Selmeri), xii. 30. |
| trichophyllus, xii. 209. | argentatus, xiv. 6. |
| Baudotii (confusus), xv. 56. | myricæ (hesperius), xiv. 6. |
| Auricomus, xiv. 27. | macrophyllus (Schlechtendalii), <i>J. B.</i> , xl. 81. |
| †Papaver Argemone, xii. 29. | Questierii, <i>J. B.</i> , xl. 81. |
| Fumaria capreolata, xii. 252. | micans, <i>J. B.</i> , xl. 81. |
| Boræi, xiii. 11. | hirtifolius (danicus), <i>J. B.</i> , xl. 81. |
| *Hesperis matronalis, J. & K. | anglosaxonicus, xiv. 7. |
| *Erysimum cheiranthoides, xv. 56. | infestus, xii. 250. |
| *Lepidium Draba, xii. 252, xiii. 4. | radula (anglicanus), <i>J. B.</i> , xl. 81. |
| Viola palustris, xii. 249. | scaber, xiv. 7. |
| Reichenbachiana, xii. 249. | cæsius, xiv. 7. |
| canina, xv. 56. | Rosa involuta, xv. 57. |
| Polygala vulgaris, xii. 29. | hibernica, xii. 250. |
| Lychnis diurna, xii. 29. | obtusifolia (frondosa), xv. 57. |
| † Githago, xiii. 251. | Callitriche stagnalis, xii. 31. |
| Stellaria palustris, xv. 57. | obtusangula, xv. 58. |
| Arenaria trinervia, xv. 57. | Peplis Portula, xii. 31. |
| Montia fontana, xii. 249. | *Carum Carui, L. F. C., iii. 34. |
| †Althæa officinalis, xii. 30. | Anthriscus vulgaris, xii. 209. |
| Linum angustifolium, xii. 30. | Galium boreale, xiii. 251. |
| Geranium pyrenaicum, L.F.C., iii. 34. | † erectum, xii. 32. |
| Rhamnus catharticus, xii. 209. | † Mollugo, xii. 209, 251. |
| Trifolium medium, xii. 30. | *Inula Helenium, xii. 32. |
| Rubus plicatus, xiv. 6. | *Matricaria discoidea, xii. 253. |
| rhamnifolius, xiv. 6. | |
| pulcherrimus, <i>J. B.</i> , xl. 81. | |

- **Matricaria occidentalis*, xiii. 251.
Hieracium murorum, xiii. 13.
- **Tragopogon porrifolius*, xii. 250,
 xiii. 4.
Vaccinium Oxycoccus, xii. 209.
Myosotis repens, xii. 250.
collina, xii. 33.
- **Solanum nigrum*, xii. 252.
Veronica hederæfolia, xii. 209,
 250.
montana, xii. 33.
- **Orobanche minor*, xii. 252.
- ‡*Mentha rotundifolia*, xii. 34.
Scutellaria galericulata, xv. 60.
Stachys arvensis, xii. 250.
Lamium amplexicaule, xv. 60.
- ‡*Ballota nigra*, xii. 209.
Teucrium Scordium, xiii. 251.
- **Plantago media*, xii. 34.
Polygonum mite, xv. 60.
Betula verrucosa, L. F. C., ii.
 141.
- †*Salix triandra*, xv. 60.
pentandra, xv. 60.
- ‡*fragilis*, L. F. C., ii. 141.
Juniperus nana, xii. 252.
Habenaria chloroleuca, xiv. 29.
- †*Leucojum æstivum*, xiv. 29.
Potamogeton nitens, xv. 61.
Eleocharis acicularis, xiii. 251.
- Scirpus pauciflorus*, L. F. C., ii.
 142.
fluitans, xiv. 29.
Rhynchospora fusca, xii. 35.
Cladium Mariscus, xii. 35.
Carex curta, xii. 252.
aquatilis (virescens), xv. 61.
limosa, xv. 61.
pallescens, xv. 61.
strigosa, xii. 251.
Hornschurchiana, xii. 252.
- Milium effusum*, xii. 251.
Catabrosa aquatica, L. F. C., i.
 140.
Poa nemoralis, xii. 209.
- ‡*compressa*, xii. 209.
Glyceria plicata, xii. 252.
aquatica, xii. 36.
Foucaudi, xiv. 51.
Festuca sylvatica, xv. 61.
- **Bromus secalinus*, L. F. C., iii.
 34.
Agropyron pungens, xii. 251.
acutum, xv. 61.
Lepturus filiformis, xii. 36.
Asplenium marinum, xii. 36.
Equisetum variegatum, xii. 252.
Lycopodium Selago, L. F. C., ii.
 140.
Chara contraria, xv. 61.

9. CLARE.

- Thalictrum flavum*, xiv. 191.
Ranunculus peltatus, xiv. 191.
Auricomus, xiii. 11.
Fumaria Boræi, xiii. 11.
Nasturtium sylvestre, xii. 209.
Cardamine flexuosa, xiv. 27.
Cochlearia anglica, xiv. 28.
Viola tricolor, J. & K.
- **Arenaria tenuifolia*, xiv. 191.
Montia fontana, xi. 4.
Malva moschata, xi. 4.
Vicia angustifolia, J. & K.
- ‡*Prunus Cerasus*, xi. 4.
Rubus rhamnifolius, xiv. 6.
pulcherrimus, xiv. 6.
silvaticus, xv. 57.

- Rubus iricus*, xv. 57.
pyramidalis, xiv. 6.
criniger, xiv. 7.
oigocladus, xiv. 7.
podophyllus, xiv. 7.
serpens, xiv. 7.
dumetorum, xiv. 7.
Potentilla procumbens, xiii. 12.
 **Sedum album*, xii. 209.
Myriophyllum verticillatum, xiv. 192.
 spicatum, xiv. 192.
Callitriche stagnalis, xiv. 28.
 **Petroselinum sativum*, xiv. 192.
 **Matricaria discoidea*, xv. 58.
 †*Picris echioides*, xv. 59.
Hieracium crebridens, Williams' Prod. Fl. Brit.
Leontodon hispidus, xii. 33.
Tragopogon pratensis, xiv. 28.
Pinguicula grandiflora, xii. 269.
 †*Mentha rotundifolia*, xiv. 28.
 sativa, J. & K.
Galeopsis versicolor, J. & K.
Betula verrucosa, xiv. 192.
 †*Salix fragilis*, xiv. 192.
 † *purpurea*, xiv. 193.
Orchis Morio, xiv. 193.
 incarnata, xiv. 190.
 †*Leucojum aestivum*, xiv. 29.
Allium vineale, xiv. 29.
Typha angustifolia, xiii. 259.
Luzula vernalis, xiv. 29.
Sparganium affine, xiv. 193.
Lemna polyrhiza, xiv. 193.
Potamogeton heterophyllus, xiv. 193.
 nitens, xiv. 193.
 prælongus, xiv. 193.
Carex Hudsonii, xiv. 190.
Melica uniflora, xiv. 193.
Glyceria plicata, xiv. 193.
Equisetum hyemale, xiv. 29.
 trachyodon, xiv. 193.
Chara polyacantha, xiv. 193.
Tolypella glomerata, xv. 61.

10. TIPPERARY NORTH.

- Ranunculus Auricomus*, xv. 56.
Fumaria Boræi, xiv. 159.
Ononis arvensis, xiii. 12.
Rubus pyramidalis, xiv. 6.
 leucostachys, xii. 30.
Callitriche hamulata, xv. 58.
 **Tanacetum vulgare*, xii. 32.
Hieracium vulgatum, xv. 59.
Lithospermum officinale, xiii. 13.
Scutellaria galericulata, xiii. 13.
Neottia Nidus-avis, xii. 34.
Sisyrinchium angustifolium, xiv. 197.
Allium ursinum, xiii. 14.
Melica uniflora, xii. 36.
 †*Lolium temulentum*, xii. 36.

11. KILKENNY.

- Ranunculus trichophyllus*, xiii. 10.
Fumaria Boræi, xiii. 34.
Fumaria officinalis, xv. 56.
Rubus plicatus, xii. 30.
 micans, xii. 30.

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|-------------------------------------|--------------------------------|
| Rubus Borreri, xii. 30. | Carex Pseudo-cyperus, xv. 61. |
| Kœhleri (dasyphyllus), <i>J. B.</i> | Phleum pratense, xii. 35. |
| xl. 156. | Cystopteris fragilis, xii. 36. |
| Lamium amplexicaule, xii. 34. | Equisetum maximum, xii. 36. |
| Carex muricata, xii. 35. | |

12. WEXFORD.

- | | |
|--------------------------------|-------------------------------|
| Fumaria purpurea, xiii. 11. | Polygonum lapathifolium, xii. |
| Hieracium umbellatum, xiv. 28. | 34. |
| Atriplex farinosa, x. 255. | Lemna polyrhiza, x. 255. |

13. CARLOW.

- | | |
|------------------------------|------------------------------|
| Fumaria confusa (hibernica), | Rubus Kœhleri (dasyphyllus), |
| xiii. 35. | xii. 31. |
| | Habenaria bifolia, xi. 6. |

14. QUEEN'S COUNTY.

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|--------------------------------|-------------------------------|
| Ranunculus Auricomus, xv. 56. | Epipactis latifolia, xii. 35. |
| Fumaria confusa, xv. 56. | Carex dioica, xii. 35. |
| Cerastium tetrandrum, xii. 29. | Phleum pratense, xii. 35. |
| Rubus scaber, xii. 31. | Agrostis alba, xii. 36. |
| Myosotis versicolor, xii. 33. | |

15. GALWAY SOUTH-EAST.

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|---------------------------------|------------------------------|
| Ranunculus sceleratus, xii. 29. | Neottia Nidus-avis, xii. 34. |
|---------------------------------|------------------------------|

16. GALWAY WEST.

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|-----------------------------------|-------------------------------|
| Ranunculus penicillatus, xii. 29. | Phleum pratense, xii. 35. |
| Crambe maritima, xii. 29. | Trisetum flavescens, xii. 36. |
| †Viola odorata, xii. 29. | Catabrosa aquatica, xii. 36. |
| ‡Symphytum officinale, xii. 33. | Bromus sterilis, xii. 36. |
| Verbascum Thapsus, xii. 33. | |

17. GALWAY NORTH-EAST.

- | | |
|---------------------------------|-----------------------------------|
| Ranunculus heterophyllus, xv. | Arctostaphylos Uva-ursi, xii. 33. |
| 56. | Phleum pratense, xii. 35. |
| Rubus leucostachys, xiv. 7. | Agrostis canina, xii. 36. |
| dumetorum, xii. 31. | Adiantum Capillus-Veneris, xi. |
| Rosa mollis, <i>J. & K.</i> | 321. |
| *Petasites fragrans, xiv. 28. | |

18. KING'S COUNTY.

- | | |
|-----------------------------------|---------------------------------|
| Ranunculus penicillatus, xii. 29. | Guaphalium uliginosum, xiv. 28. |
| Fumaria confusa, xiii. 35. | ‡Lactuca muralis, xiii. 260. |
| officinalis, xiii. 11. | Convolvulus arvensis, xiv. 28. |
| Ononis arvensis, xi. 4. | Bromus erectus, xii. 36. |
| Lathyrus palustris, xi. 184. | |

19. KILDARE.

- | | |
|----------------------------------|----------------------------------|
| Ranunculus Lenormandi, xiii. 11. | Lithospermum arvense, xiv. 13. |
| Sisymbrium Thalianum, xiv. 12. | *Mimulus guttatus, xiv. 13. |
| Viola palustris, xiii. 11. | Lathræa squamaria, xiv. 13. |
| Polygala serpyllacea, xiii. 11. | Polygonum Hydropiper, xiii. 14. |
| *Saponaria officinalis, xiv. 12. | Juncus squarrosus, xiii. 14. |
| ‡Melilotus officinalis, xiv. 12. | Potamogeton lucens, xiv. 13. |
| Lotus uliginosus, xiv. 12. | Zannichellia palustris, xiv. 13. |
| Saxifraga granulata, xiv. 12. | Carex sylvatica, xi. 170. |
| *Sempervivum tectorum, xiii. 12. | Phleum pratense, xi. 170. |
| ‡Foeniculum officinale, xiv. 12. | Agrostis canina, xiv. 13. |
| Filago germanica, xiv. 12. | Melica uniflora, xiv. 13. |
| Gnaphalium uliginosum, xiv. 12. | Agropyron caninum, xiv. 13. |
| Arctium majus, xiv. 13. | Botrychium Lunaria, xi. 6. |
| *Centaurea Cyanus, xiv. 13. | |

20. WICKLOW.

- | | |
|---------------------------------|--------------------------------|
| Fumaria purpurea, xiii. 36. | ‡Poa compressa, xv. 61. |
| *Matricaria discoidea, xii. 32. | *Bromus secalinus, xv. 61. |
| Potamogeton plantagineus, xi. | Cryptogramme crispa, xiv. 222. |
| 170. | |

21. DUBLIN.

- | | |
|-------------------------------------|---------------------------------|
| Fumaria purpurea, xiii. 186. | Hieracium murorum, xii. 189, |
| Boræi, xiv. 159. | xiii. 57. |
| *Lepidium Draba, xii. 187, xiii. 4. | sciaphilum, xii. 247. |
| *Trifolium agrarium, xiii. 12. | Vaccinium Oxycoccus, xii. 189. |
| Rubus plicatus, xiii. 297. | *Lysimachia Nummularia, xii. |
| Agrimonia odorata, xiii. 56. | 190. |
| *Sedum album, xii. 187. | Utricularia vulgaris, xii. 190. |
| Callitriche obtusangula, xii. 187. | *Salix pentandra, xiii. 59. |
| Galium uliginosum, xiii. 56. | Carex aquatilis, x. 49. |
| *Matricaria occidentalis, iii. 215, | pallescens, xiii. 59. |
| xiii. 57. | Milium effusum, xi. 322. |
| Arctium Newbouldii, xii. 113. | Agropyron acutum, xv. 61. |
| *Crepis biennis, xi. 184. | |

22. MEATH.

- Anemone nemorosa*, xiii. 10.
Fumaria Boræi, xiii. 34.
 confusa, xiii. 35.
 densiflora, xiv. 161.
Cochlearia danica, xiv. 28.
 anglica, xv. 56.
Montia fontana, xii. 29.
Hypericum elodes, xv. 57.
Geranium columbinum, xi. 4,
 xiii. 11.
 **Trifolium agrarium*, xiii. 12.
Potentilla procumbens, xiii. 12.
Callitriche autumnalis, xiii. 12.
Caucalis nodosa, xii. 31.
Solidago Virgaurea, xiii. 12.
Bidens tripartita, xii. 32.
 **Matricaria occidentalis*, xiv. 28
 **Silybum Marianum*, xii. 32.
Jasione montana, xiii. 13.
Lysimachia nemorum, xiii. 13.
Veronica agrestis, xi. 5.
 scutellata, xii. 34.
Stachys arvensis, xiii. 13.
Lamium intermedium, xiii. 14.
Teucrium Scorodonia, xiii. 14.
Scleranthus annuus, xii. 34.
Polygonum minus, xiii. 14.
Orchis mascula, xiii. 14.
Allium ursinum, xiii. 14.
Luzula maxima, xiii. 14.

23. WESTMEATH.

- **Clematis Vitalba*, xii. 29.
Fumaria officinalis, J. & K.
 †*Lychnis vespertina*, xii. 29.
Cerastium tetrandrum, xii. 29.
Montia fontana, xii. 29.
Hypericum humifusum, xii. 30.
Rosa mollis, J. & K.
Callitriche vernalis, J. & K.
 stagnalis, J. & K.
Scandix Pecten-Veneris, xii. 31.
 **Sambucus Ebulus*, xii. 31.
Valerianella olitoria, xii. 32.
Filago germanica, xii. 32.
Gnaphalium uliginosum, xii. 32.
Bidens tripartita, xii. 32.
Senecio sylvaticus, xii. 32.
 **Cichorium Intybus*, xii. 32.
Erica cinerea, xii. 33.
 **Achusa sempervirens*, J. & K.
Myosotis versicolor, xii. 33.
Solanum Dulcamara, xii. 33.
Veronica polita, xii. 33.
Orobanche Hederæ, xi. 184.
Pinguicula lusitanica, xiii. 13.
 †*Verbena officinalis*, xii. 34.
Mentha sativa, J. & K.
Thymus Serpyllum, xii. 34.
Teucrium Scorodonia, xii. 34.
Blechnum Spicant, xii. 36.

24. LONGFORD.

- †*Brassica nigra*, xii. 270.
Arcetium Newbouldii, xiii. 13.
Orobanche Hederæ, xi. 184.
Galeopsis versicolor, xii. 270.
Bromus mollis, xii. 270.
Agropyron repens, xii. 270.

25. ROSCOMMON.

Ranunculus Auricomus, xi. 4.	Populus tremula, xi. 6.
Sisymbrium Alliaria, xi. 4.	Empetrum nigrum, xi. 6.
Rhamnus Frangula, xi. 4.	Carex strigosa, xii. 35.
Hypopithys multiflora, x. 201, xi. 5.	Agrostis alba, xiv. 29.
	Melica uniflora, xiv. 29.

27. MAYO WEST.

Ranunculus trichophyllus, xiv. 235.	Hieracium hypochæroides, xii. 284.
Baudotii, xiv. 235.	Orarium, xii. 311.
*Chelidonium majus, xii. 269.	*Campanula rapunculoides, xii. 269.
Fumaria capreolata, xiii. 282. officinalis, xiv. 233.	Pyrola media, xiv. 28.
Cochlearia danica, xii. 285. grœnlandica, xiii. 282.	Convolvulus arvensis, xiv. 239.
*Lepidium Draba, xii. 269, xiii. 4.	Solanum Dulcamara, xii. 269.
Cakile maritima, xii. 269.	Hyoscyamus niger, xiv. 239.
Silene acaulis, xii. 284.	Veronica hederæfolia, xii. 269.
Stellaria Holostea, xii. 269.	Lamium hybridum, xii. 280.
†Ulex Gallii, xiii. 283.	Beta maritima, xii. 280.
Rubus cariensis, xiii. 283. rhamnifolius, xiii. 283. mucronatus, xiii. 283. dunensis, xiii. 283. rosaceus (hystrix), xiii. 283. corylifolius (cyclophyllus), xiv. 233. cæsius, xiv. 240.	Atriplex hastata, xii. 287. Polygonum Raii, xii. 269. Ceratophyllum demersum, xiv. 235.
Saxifraga decipiens, xii. 284.	*Iris foetidissima, xii. 269.
*Sempervivum tectorum, xii. 269	Potamogeton pectinatus, xiii. 286.
Epilobium angustifolium, xiii. 284.	flabellatus, xiv. 233.
Eryngium maritimum, xiii. 279.	†Glyceria aquatica, xiii. 286.
Sium angustifolium, xiv. 236.	Festuca Myuros, xii. 269.
Asperula adorata, xii. 269.	Bromus asper, xii. 269.
*Tanacetum vulgare, xiii. 272.	Agropyron repens, xii. 288.
Arctium Newbouldii, xii. 289.	Aspidium aculeatum, xii. 288.
	Ophioglossum vulgatum, xii. 288.
	Equisetum maximum, xii. 288.
	Lycopodium inundatum, xiv. 221.

28. SLIGO.

- Ranunculus circinatus*, xii. 270.
Auricomus, xii. 270.
Papaver dubium, xiii. 205.
 † *hybridum*, xiii. 205.
 **Chelidonium majus*, xv. 56.
 †*Brassica Rapa (Briggsii)*, xii. 270.
Senebiera Coronopus, xii. 270.
Cakile maritima, xi. 123.
Spergularia rupestris, xiii. 11.
Hypericum humifusum, xii. 270.
Lotus uliginosus, xiii. 206.
Vicia angustifolia, xii. 270.
 **Sempervivum tectorum*, xii. 270.
 **Sedum album*, xiii. 206.
Epilobium angustifolium, xi. 184.
Cicuta virosa, xii. 270.
Crithmum maritimum, xiii. 206.
Æthusa Cynapium, xiii. 206.
 †*Anthemis Cotula*, xii. 270.
 **Matricaria discoidea*, xii. 270.
 * *occidentalis*, xiv. 28.
 **Tanacetum vulgare*, xii. 270.
 **Cichorium Intybus*, xiii. 206.
Chlora perfoliata, xiii. 206.
 †*Verbascum Thapsus*, xii. 33.
 †*Linaria vulgaris*, xiii. 206.
 **Mimulus guttatus*, xii. 270.
Veronica hederæfolia, xii. 270.
agrestis, xv. 59.
Euphrasia Salisburgensis, xiv. 221.
Orobanche rubra, xiv. 222.
Lycopus europæus, xii. 270.
Chenopodium rubrum, xiii. 206.
Ulmus montana, xii. 270.
 †*Salix fragilis*, xii. 270.
Empetrum nigrum, xii. 270.
Orchis Morio, xii. 35.
Sisyrinchium angustifolium, xiii. 207.
Potamogeton heterophyllus, xiii. 207.
obtusifolius, xii. 270.
Scirpus fluitans, xv. 61.
Carex curta, xii. 270.
extensa, xii. 270.
paludosa, xii. 270.
riparia, xiv. 29.
Phleum pratense, xii. 270.
Glyceria maritima, xii. 270.
Agropyron caninum, xii. 270.
Polypodium Phegopteris, xiv. 29.
Equisetum maximum, xii. 270.

29. LEITRIM.

- Ranunculus penicillatus*, xv. 56.
Papaver dubium, xv. 56.
 **Chelidonium majus*, xv. 56.
Fumaria confusa (hibernica), xiv. 161.
Brassica alba, xii. 270.
Reseda Luteola, xv. 56.
Polygala vulgaris, xii. 29.
Silene Cucubalus, xv. 56.
 **Trifolium hybridum*, xii. 270.
Lathyrus macrorrhizus, xii. 270.
Rubus Kœhleri (dasyphyllus), xv. 57.
Potentilla procumbens, xv. 57.
 †*Smyrniium Olusatrum*, xii. 270.
Scandix Pecten-Veneris, xv. 58.

- Scabiosa arvensis*, xv. 58.
Gnaphalium sylvaticum, xiii.
 12.
 **Matricaria discoidea*, xiv. 28.
 **Tanacetum vulgare*, xii. 270.
Convolvulus arvensis, xv. 59.
 **Polygonum Bistorta*, xii. 34.
Ulmus montana, xiv. 221.
Parietaria officinalis, xv. 60.
Salix repens, xii. 270.
30. CAVAN.
- Ranunculus trichophyllus*, xv.
 55.
penicillatus, xv. 56.
Papaver Rhæas, xii. 29.
 **Chelidonium majus*, xv. 56.
Fumaria officinalis, xiii. 36.
Brassica alba, xv. 56.
 †*Lychnis Githago*, xv. 57.
Hypericum dubium, xv. 57.
Vicia hirsuta, xiii. 12.
 **Prunus insititia*, xv. 57.
Padus, xi. 4.
Rubus plicatus, xv. 57.
pyramidalis, xv. 57.
corylifolius, xv. 57.
Rosa spinosissima, xv. 57.
arvensis, xv. 58.
 †*Sedum Telephium*, xv. 58.
Callitriche autumnalis, xiii. 12.
 †*Smyrnum Olusatrum*, xv. 58.
Oenanthe fistulosa, xi. 5.
Valerianella olitoria, xv. 58.
 † *Auricula*, xiii. 12.
 †*Anthemis Cotula*, xv. 58.
 **Tanacetum vulgare*, xiii. 12.
Arctium minus, xv. 59.
Carduus pycnocephalus, xii. 31.
 **Centaurea Cyanus*, xv. 59.
- Epipactis latifolia*, xii. 35.
Sparganium simplex, xv. 60.
Lemna trisulca, xv. 60.
Scirpus fluitans, xv. 61.
Glyceria plicata, xv. 61.
Festuca rigida, xv. 61.
Agropyron caninum, xiv. 221.
Botrychium Lunaria, xii. 270.
Equisetum hyemale, xiv. 221.
- Jasione montana*, xv. 59.
Vaccinium Oxycoccus, xiii. 13.
Solanum Dulcamara, xv. 59.
Lithospermum officinale, xiii.
 13.
 †*Verbascum Thapsus*, xv. 59.
Galeopsis versicolor, xv. 60.
 **Chenopodium Bonus-Henricus*,
 xv. 60.
Salix repens, xv. 60.
 † *fragilis*, xv. 60.
Orchis pyramidalis, xiii. 14.
Juncus obtusiflorus, xiv. 260.
Luzula vernalis, xv. 60.
Sparganium minimum, xiv. 260.
Lemna gibba, xiv. 260.
Potamogeton heterophyllus, xiv.
 260.
Zizii, xiv. 260.
Carex teretiuscula, xiii. 14.
limosa, xiii. 14.
filiformis, xiv. 260.
Avena pubescens, xv. 61.
Bromus sterilis, xv. 61.
 †*Lolium temulentum*, xv. 61.
Isoetes lacustris, xiv. 260.
Chara polyacantha, xiv. 260.
Nitella flexilis, xi. 143.

31. LOUTH.

- Fumaria capreolata*, xiv. 158.
 confusa, xiii. 11.
 purpurea, xiii. 36.
Cochlearia anglica, xv. 56.
Trifolium filiforme, xi. 200.

- Saxifraga tridactylites*, xiv. 28.
 ‡*Sedum Telephium*, xiv. 28.
Festuca Myuros, xi. 200.
Equisetum hyemale, xi. 184.

32. MONAGHAN.

- Ranunculus Auricomus*, xv. 56. ‡*Mentha piperita*, xv. 59.
 **Chelidonium majus*, xv. 56. *sativa*, xv. 59.
Viola odorata, xv. 56. *Origanum vulgare*, xv. 59.
Polygala vulgaris, xv. 56. ‡*Ballota nigra*, xv. 60.
Arenaria trinervia, xv. 57. **Chenopodium Bonus-Henricus*,
 xv. 60.
Hypericum elodes, xv. 57. *Euphorbia exigua*, xv. 60.
Anthyllis Vulneraria, xii. 270. *Juncus obtusiflorus*, xv. 60.
Myriophyllum spicatum, xv. 58. *Sagittaria sagittifolia*, xv. 60.
Sium latifolium, xv. 58. *Potamogeton plantagineus*, xv.
 61.
Pimpinella Saxifraga, xv. 58. *Rhynchospora alba*, xiv. 259.
Æthusa Cynapium, xv. 58. *Carex vulpina*, xv. 61.
Valerianella olitoria, xv. 58. *strigosa*, xiv. 259.
Solidago Virgaurea, xv. 58. *Avena pubescens*, xv. 61.
 **Tanacetum vulgare*, xv. 58. *Glyceria plicata*, xv. 61.
Senecio sylvaticus, xv. 58. *Festuca elatior*, xv. 61.
Arctium minus, xv. 59. *Bromus sterilis*, xv. 61.
 **Silybum Marianum*, xv. 59. *Chara aspera desmacantha*, xi.
 143.
 **Cichorium Intybus*, xv. 59. *hispida*, xi. 142.
Leontodon hirtus, xiv. 259. *contraria*, xi. 143.
Andromeda Polifolia, xiv. 259. *vulgaris*, xi. 142.
Primula officinalis, xi. 5. *Nitella mucronata*, xi. 142.
Veronica hederæfolia, xv. 59.
 polita, xv. 59.
 montana, xiv. 259.
Lathræa squamaria, xiv. 259.

33. FERMANAGH.

- Ranunculus scoticus*, xiii. 238. *Meconopsis cambrica*, xiii. 238.
 **Papaver somniferum*, xii. 29. *Fumaria confusa*, xiv. 160.
 Rhæas, xii. 29. *Brassica alba*, xii. 270.
 dubium, xii. 29. ‡*Lychnis Githago*, xii. 29.

- Rubus pulcherrimus, xiii. 239.
 longithyriger (botryeros),
 xiii. 238.
- Saxifraga stellaris, xii. 31.
 aizoides, xii. 31.
- *Sempervivum tectorum, xii. 31.
- Sedum Rhodiola, xiii. 239.
- * reflexum, xii. 31.
- Peplis Portula, xii. 31.
- Epilobium angustifolium, xiii.
 239.
- Chærophyllum temulum, xii. 31.
- Scandix Pecten-Veneris, xiv. 28.
- Œnanthe fistulosa, xii. 31.
- †Galium erectum, xii. 32.
- †Dipsacus sylvestris, xii. 32.
- *Matricaria discoidea, xiv. 259.
- *Petasites fragrans, xii. 270.
- Lobelia Dortmanna, xiii. 239.
- Vaccinium Oxycoccus, xii. 33.
- Pyrola media, xiii. 239.
 minor, xiii. 239.
 secunda, x. 171, xi. 5.
- Hypopithys multiflora, xiii. 259.
- †Verbascum Thapsus, xii. 33.
- Scrophularia aquatica, xii. 33.
- *Veronica peregrina, xii. 34.
- Euphrasia Salisburgensis, xiii.
 240.
- Pinguicula lusitanica, xii. 34.
- Origanum vulgare, xii. 270.
- *Chenopodium Bonus-Henricus,
 xii. 34.
- Ulmus montana, xiii. 240.
- Juniperus nana, xiii. 240.
- Sisyrinchium angustifolium,
 xi. 6.
- Juncus obtusiflorus, xii. 35.
- Butomus umbellatus, xii. 35.
- Eriophorum latifolium, xiii. 240.
- Carex dioica, xiii. 240.
 teretiusecula, xi. 6.
 paludosa, xiii. 241.
- Alopecurus pratensis, xii. 35.
- Ophioglossum vulgatum, xiii.
 241.
- Botrychium Lunaria, xi. 6.
- Equisetum pratense, xiii. 241.
 trachyodon, xiii. 241.
- Lycopodium clavatum, xiv. 259.

34. DONEGAL EAST.

- Fumaria Boræi, xiv. 159.
- Viola arvensis, xiv. 28.
- Arctium Newbouldii, xiii. 13.
- Malaxis paludosa, xi. 321.

35. DONEGAL WEST.

- Viola arvensis, xiv. 28.
- Hieracium stictophyllum, xv. 59.

36. TYRONE.

- Ranunculus Auricomus, xiii. 11.
- Fumaria purpurea, xiii. 36.
- *Hesperis matronalis, xv. 56.
- Vicia hirsuta, xi. 4.
- Rubus villicaulis (Selmeri), xv.
 57.
 leucostachys, xv. 57.
- Kœhleri (dasypphyllus) xv. 57.
- Rosa arvensis, xv. 58.
- Leontodon hirtus, xv. 59.
- Primula officinalis, xv. 59.
- Scleranthus annuus, xii. 34.
- Orehis pyramidalis, xv. 60.
- †Leucojum æstivum, xv. 60.
- Lemna trisulca, xi. 6.
- Carex Hornschuchiana, xi. 6.
- Ophioglossum vulgatum, xv.
 61.

37. ARMAGH.

- | | |
|--------------------------|-------------------------------|
| Rubus micans, x. 215. | Rubus Bloxamii, x. 219. |
| Lettii, x. 217. | Arctium Newbouldii, ii. 132, |
| Gelertii, x. 217. | xiii. 3. |
| dunensis, x. 218. | Tragopogon pratensis, xv. 59. |
| oigocladus (Newbouldii), | Habenaria viridis, xi. 6. |
| x. 219. | |

38. DOWN.

- | | |
|----------------------------------|--------------------------------------|
| Ranunculus penicillatus, | *Valerianella carinata, 872, |
| W. B. E. C. 1901-2. | xiii. 4. |
| Fumaria purpurea, xiv. 159. | ‡ Auricula, xii. 263. |
| Teesdalia nudicaulis, xi. 209. | Artemisia maritima, xi. 209. |
| Stellaria palustris, xi. 209. | Hieracium Sommerfeltii, xii. |
| Geranium columbinum, xii. | 311. |
| 262. | pachyphyllum, Linton's Brit. |
| ‡ lucidum, xii. 30. | Hier., and B. E. C. 1900. |
| Trigonella ornithopodioides, xi. | rivale, xii. 311. |
| 209. | *Tragopogon porrifolius, 874, |
| *Medicago maculata, xi. 209. | xiii. 4. |
| Trifolium striatum, xi. 209. | Statice occidentalis, xi. 209. |
| filiforme, xi. 209. | *Plantago media, xii. 271. |
| Rubus argentatus, x. 215. | Chenopodium rubrum, xii. 263. |
| myricæ (hesperius), x. 215. | ‡ Juncus tenuis, xii. 108, xiii. 43. |
| micans, x. 215. | Potamogeton plantagineus, xi. |
| Lettii, x. 216. | 209. |
| cinerosus, x. 217. | flabellatus, xi. 209. |
| anglosaxonicus (vestitifor- | Carex divulsa, xii. 264. |
| mis), x. 217. | Hudsonii, xi. 210. |
| Borreri, x. 217. | Glyceria plicata, xii. 264. |
| dunensis, x. 218. | festucæformis, xii. 264. |
| mutabilis, x. 219. | Lastrea spinulosa, xii. 264. |
| ‡Galium Mollugo, xii. 271. | Chara polyacantha, xi. 210. |

39. ANTRIM.

- | | |
|----------------------------------|-------------------------------|
| Ranunculus circinatus, xii. 247. | Rubus plicatus, x. 214. |
| Fumaria purpurea, xiii. 36. | micans, x. 215. |
| confusa, xiv. 161. | Gelertii, x. 217. |
| *Trifolium agrarium, xi. 201. | Crithmum maritimum, xii. 245. |

Aretium Newbouldii, xiii. 13.	*Tragopogon porrifolius, 874,
Hieracium pachyphyllum, Lin-	xiii. 4.
ton's Brit. Hier. and <i>J.B.</i> ,	Spiranthes Romanzoffiana, x.
xxxiii. 114.	171.
Orarium, Linton's Brit. Hier.	Carex irrigua, x. 165.

40. LONDONDERRY.

Fumaria confusa, xiv., 161.

The above list answers the question, What plants have been added to the flora of any division since the publication of "Irish Topographical Botany"? An equally important question is, Has the range of such and such a plant been extended during this period? To provide an answer to this inquiry, I now rearrange the list of additional records in systematic order, appending, to the names of the species, numbers expressing the botanical divisions to which the plants have been added:—

NEW RECORDS ARRANGED SYSTEMATICALLY.

* <i>Clematis vitalba</i> , 23.	<i>Papaver dubium</i> , 28, 29, 33.
<i>Thalictrum flavum</i> , 9.	† <i>Argemone</i> , 8.
<i>Anemone nemorosa</i> , 22.	† <i>hybridum</i> , 28.
<i>Ranunculus circinatus</i> , 8, 28, 39.	<i>Meconopsis cambrica</i> , 33.
<i>trichophyllum</i> , 8, 11, 27, 30.	* <i>Chelidonium majus</i> , 27, 28, 29,
<i>Drouetii</i> , 1.	30, 32.
<i>heterophyllum</i> , 2, 4, 17.	<i>Fumaria capreolata</i> , 8, 27, 31.
<i>peltatus</i> , 9.	<i>Boræi</i> , 4, 5, 6, 7, 8, 9, 10, 11,
<i>penicillatus</i> , 16, 18, 29, 30,	21, 22, 34.
38.	<i>purpurea</i> , 1, 2, 12, 20, 21,
<i>Baudotii</i> , 8 (<i>confusus</i>), 27.	31, 36, 38, 39.
<i>Lenormandi</i> , 19.	<i>confusa</i> , 13 (<i>hibernica</i>), 14,
<i>sceleratus</i> , 7, 15.	18, 22, 29 (<i>hibernica</i>), 31,
<i>scoticus</i> , 33.	33, 39, 40.
<i>Auricomus</i> , 8, 9, 10, 14, 25,	<i>officinalis</i> , 11, 18, 23, 27, 30.
28, 32, 36.	<i>densiflora</i> , 22.
* <i>Papaver somniferum</i> , 33.	<i>Nasturtium sylvestre</i> , 9.
<i>Rhæas</i> , 30, 33.	<i>Cardamine flexuosa</i> , 9.

- Cochlearia danica*, 2, 22, 27.
grænlandica, 27.
anglica, 9, 22, 31.
 **Hesperis matronalis*, 8, 36.
Sisymbrium Thalianum, 19.
Alliaria, 25.
 **Erysimum cheiranthoides*, 8.
 †*Brassica Rapa (Briggsii)*, 28.
nigra, †24.
alba, 7, 29, 30, 33.
 †*Diploxys muralis*, *2.
Senebiera Coronopus, 28.
 **Lepidium Draba*, 8, 21, 27.
Teesdalia nudicaulis, 2, 38.
Crambe maritima, 16.
Cakile maritima, 27, 28.
Reseda Luteola, 29.
Viola palustris, 8, 19.
odorata, †16, 32.
Reichenbachiana, 8.
canina, 8.
tricolor, 9.
arvensis, 34, 35.
Polygala vulgaris, 8, 29, 32.
serpyllacea, 19.
 **Saponaria officinalis*, 19.
Silene Cucubalus, 29.
acaulis, 27.
 †*Lychnis vespertina*, 23.
diurna, 8.
 † *Githago*, 8, 30, 33.
Cerastium tetrandrum, 7, 14, 23.
arvense, 2.
Stellaria Holostea, 27.
palustris, 8, 38.
 **Arenaria tenuifolia*, 9.
trinervia, 8, 32.
Spargularia rubra, 1.
rupestris, 28.
Montia fontana, 8, 9, 22, 23.
 **Hypericum hircinum*, 7.
Hypericum dubium, 30.
humifusum, 23, 28.
elodes, 22, 32.
 †*Althæa officinalis*, 8.
Malva moschata, 9.
Linum angustifolium, 8.
Geranium pyrenaicum, 8.
columbinum, 22, 38.
lucidum, †38.
Erodium cicutarium, 7.
Rhamnus catharticus, 8.
Frangula, 25.
Ulex Gallii, † 27.
Ononis repens, 10, 18.
Trigonella ornithopodioides,
 38.
 **Medicago maculata*, 38.
 †*Melilotus officinalis*, 19.
Trifolium medium, 8.
striatum, 38.
 * *hybridum*, 29.
 * *agrarium*, 21, 22, 39.
filiforme, 31, 38.
Anthyllis Vulneraria, 32.
Lotus uliginosus, 19, 28.
Vicia hirsuta, 30, 36.
angustifolia, 9, 28.
Lathyrus palustris, 18.
macrorrhizus, 29.
 **Prunus insititia*, 30.
 † *Cerasus*, 9.
Padus, 30.
Rubus suberectus, 1.
plicatus, 1, 2, 8, 11, 21, 30,
 39.
nitidus, 1 (opacus).
affinis, 1 (Briggsianus).
cariensis, 2, 27.
rhamnifolius, 8, 9, 27.
pulcherrimus, 1, 2, 3, 8, 9,
 33.

- Rubus villicaulis*, 1 (Selmeri and rhombifolius), 5, 8, 36 (all Selmeri).
argentatus, 1 (*robustus*), 2, 3, 8, 38.
silvaticus, 9.
myricæ (*hesperius*), 8, 38.
macrophyllus, 8 (*Schlechtendalii*).
Questierii, 3, 8.
micans, 1, 2, 8, 11, 37, 38, 39.
hirtifolius, 8 (*danicus*).
iricus, 1, 2, 9.
pyramidalis, 1, 2, 9, 10, 30.
leucostachys, 10, 17, 36.
Lettii, 37, 38.
criniger, 9.
cincerosus, 38.
mucronatus, 1, 27.
Gelertii, 37, 39.
anglosaxonicus, 1 (*raduloides*), 2, 8, 38 (*vestitifomis*).
infestus, 8.
Borreri, 11, 38.
dunensis, 27, 37, 38.
radula, 8 (*anglicanus*).
oigocladus, 9, 37 (*Newbouldii*).
regillus, 1, 2.
podophyllus, 2, 9.
Babingtonii, 1.
mutabilis, 2, 5, 38.
Bloxamii, 37.
fuscus, 2.
scaber, 8, 14.
longithyriger (*botryeros*), 5, 33.
Köhleri (*dasyphyllus*), 11, 13, 29, 36.
roseaceus, 27 (*hystrix*).
Rubus serpens, 2, 9.
dumetorum, 9, 17.
corylifolius, 2 (*sublustris*), 7, 27 (both *cyclophyllus*), 30.
cæsius, 8, 27.
Potentilla procumbens, 1, 2, 9, 22, 29.
Agrimonia odorata, 21.
Rosa spinosissima, 30.
involuta, 8.
hibernica, 8.
mollis, 17, 23.
obtusifolia, 8 (*frondosa*).
glauca, 3 (*subcristata*).
arvensis, 30, 36.
Saxifraga stellaris, 33.
aizoides, 33.
tridactylites, 31.
granulata, 19.
decipiens, 27.
**Sempervivum tectorum*, 19, 27, 28, 33.
Sedum Rhodiola, 33.
‡ *Telephium*, 30, 31.
* *album*, 9, 21, 28.
* *reflexum*, 33.
Myriophyllum verticillatum, 9.
spicatum, 7, 9, 32.
Callitriche vernalis, 23.
stagnalis, 8, 9, 23.
hamulata, 10.
obtusangula, 1, 8, 21.
autumnalis, 22, 30.
Peplis Portula, 8, 33.
Epilobium angustifolium, 27, 28, 33.
Eryngium maritimum, 27.
‡ *Smyrniium Olusatrum*, 29, 30.
Cicuta virosa, 28.
* *Petroselinum sativum*, 9.
* *Carum Carui*. 8.

- Sium latifolium*, 32.
angustifolium, 27.
Pimpinella Saxifraga, 32.
Chærophyllum temulum, 33.
Scandix Pecten-Veneris, 23, 29,
 33.
Anthriscus vulgaris, 8.
 †*Fœniculum officinale*, 19.
Crithmum maritimum, 28, 39.
Cenanthe fistulosa, 30, 33.
Phellandrium, 2.
Æthusa Cynapium, 28, 32.
Caucalis nodosa, 22.
 **Sambucus Ebulus*, 23.
Galium boreale, 8.
 † *erectum*,¹ 1, 2, 8, †33.
 † *Mollugo*, †2, 8, 38.
uliginosum, 21.
Asperula odorata, 27.
Valerianella olitoria, 23, 30,
 32.
 * *carinata*, 2, 38.
Auricula, 30, 38.
Dipsacus sylvestris, †33.
Scabiosa arvensis, 29.
Solidago Virgaurea, 22, 32.
Filago germanica, 19, 23.
Gnaphalium uliginosum, 18, 19,
 23.
sylvaticum, 29.
 **Inula Helenium*, 8.
Bidens tripartita, 7, 22, 23.
 †*Anthemis Cotula*, 3, 28, 30.
 **Matricaria discoidea*, 4, 5, 8, 9,
 20, 28, 29, 33.
occidentalis, 2, 8, 21, 22, 28:
 **Tanacetum vulgare*, 10, 27, 28,
 29, 30, 32.
Artemisia maritima, 38.
 **Petasites fragrans*, 2, 17, 33.
Senecio sylvaticus, 23, 32.
Arctium majus, 19.
minus, 7, 30, 32.
Newbouldii, 3, 21, 24, 27,
 34, 37, 39.
Carduus pycnocephalus, 30.
 **Silybum Marianum*, 22, 32.
 **Centaurea Cyanus*, 19, 30.
 **Cichorium Intybus*, 23, 28, 32.
 †*Pieris echioides*, 9.
 †*Crepis taraxacifolia*, †5.
 * *biennis*, 2, 21.
Hieracium Schmidtii, 4.
argenteum, 1.
Sommerfeltii, 38.
orimeles, 1, 2.
hypochoeroides, 27.
pachyphyllum, 38, 39.
crebridens, 9.
rivale, 38.
murorum, 8, 21.
vulgatum, 10.
Orarium, 27, 39.
sciaphilum, 21.
Scullyi, 1.
stictophyllum, 35.
sparsifolium, 1, 2.
umbellatum, 12.
 †*Lactuca muralis*, 18.
Leontodon hirtus, 32, 36,
hispidus, 9.
Tragopogon pratensis, 9, 37.
 * *porrifolius*, 5, 8, 38, 39.
Lobelia Dortmanna, 33.
Jasione montana, 22, 30.
 **Campanula rapunculoides*, 27.

¹ Dr. Scully believes this plant to be native in South and North Kerry, and West Cork (*J.N.* xiii. 78).

- Vaccinium Oxycoccus*, 8, 21,
 30, 33.
Arctostaphylos Uva-ursi, 17.
Andromeda Polifolia, 32.
Erica cinerea, 23.
Pyrola media, 27, 33.
 minor, 33.
 secunda, 33.
Hypopithys multiflora, 25, 33.
Statice occidentalis, 38.
Primula officinalis, 6, 32, 36.
 **Lysimachia Nummularia*, 21.
 nemorum, 22.
Centunculus minimus, 2.
Samolus Valerandi, 7.
Chlora perfoliata, 28.
 †*Symphytum officinale*, 16.
 **Anchusa sempervirens*, 23.
Myosotis repens, 8.
 collina, 8.
 versicolor, 14, 23.
Lithospermum officinale, 2, 10, 30.
 arvense, 19.
Convolvulus arvensis, 18, 27, 29.
 †*Cuscuta Trifolii*, *1, 3.
Solanum Dulcamara, 23, 27, 30.
 * *nigrum*, 8.
Hyoscyamus niger, 27.
Verbascum Thapsus, 16, †28,
 ‡30, ‡33.
 †*Linaria vulgaris*, †28.
Scrophularia aquatica, 33.
 **Mimulus guttatus*, 19, 28.
Veronica hederæfolia, 8, 27, 28,
 32.
 agrestis, 22, 28.
 polita, 23, 32.
 montana, 8, 32.
 scutellata, 22.
 * *peregrina*, 33.
 Euphrasia Salisburgensis, 28, 33.
Orobanche rubra, 28.
 Hederæ, 23, 24.
 * *minor*, 8.
Lathræa squamaria, 19, 32.
Utricularia vulgaris, 21.
Pinguicula vulgaris, 6.
 grandiflora, 9.
 lusitanica, 23, 33.
 †*Verbena officinalis*, 23.
 †*Mentha piperita*, 32.
 † *rotundifolia*, 8, 9.
 sativa, 9, 23, 32.
Lycopus europæus, 28.
Origanum vulgare, 32, 33.
Thymus Serpyllum, 23.
Scutellaria galericulata, 8, 10.
Stachys arvensis, 8, 22.
Galeopsis versicolor, 9, 24, 30.
Lamium amplexicaule, 8, 11.
 intermedium, 6, 22.
Lamium hybridum, 27.
 †*Ballota nigra*, 8, 32.
Teucrium Scordium, 8.
 Scorodonia, 22, 23.
 **Plantago media*, 8, 38.
Scleranthus annuus, 22, 36.
Chenopodium rubrum, 28, 38.
 * *Bonus-Henricus*, 30, 32, 33.
Beta maritima, 27.
Atriplex littoralis, 5.
 hastata, 1, 2, 27.
 farinosa, 12.
Polygonum Raii, 27.
 Hydropiper, 19.
 lapathifolium, 12.
 minus, 22.
 mite, 8.
 * *Bistorta*, 29.
Euphorbia exigua, 32
Ulmus montana, 28, 29, 33.
Parietaria officinalis, 29.

- Betula verrucosa*, 8, 9.
Salix triandra, †8.
 pentandra, *2, 8, *21.
 ‡ *fragilis*, 8, 9, 28, 30.
 repens, 29, 30.
 † *purpurea*, 9.
Populus tremula, 25.
Empetrum nigrum, 25, 28.
Ceratophyllum demersum, 27.
Juniperus nana, 8, 33.
Malaxis paludosa, 34.
Neottia Nidus-avis, 10, 15.
Spiranthes Romanzoffiana, 39.
Epipactis latifolia, 14, 29. *
Orchis pyramidalis, 30, 36.
 Morio, 9, 28.
 mascula, 22.
 incarnata, 9.
 latifolia, 1, 2, 3.
Ophrys apifera, 2.
Habenaria viridis, 37.
 bifolia, 13.
 chloroleuca, 8.
 **Iris fœtidissima*, 27.
Sisyrinchium angustifolium, 10,
 28, 33.
 †*Leucojum æstivum*, 8, 9, 36.
Allium vineale, 9.
 ursinum, 10, 22.
Typha angustifolia, 9.
Juncus squarrosus, 19.
 † *tenuis*, 38.
 glaucus, †1.
 obtusiflorus, 30, 32, 33.
Luzula maxima, 22.
 vernalis, 9, 30. ■
Sparganium simplex, 29.
 affine, 9.
 minimum, 30.
Lemna trisulca, 29, 36.
 gibba, 30.
- Lemna polyrhiza*, 7, 9, 12.
Sagittaria sagittifolia, 32.
Butomus umbellatus, 33.
Potamogeton plantagineus, 2, 20,
 32, 38.
 heterophyllus, 7, 9, 28, 30.
 nitens, 8, 9.
 lucens, 19.
 Zizii, 30.
 prælongus, 9.
 obtusifolius, 28.
 pectinatus, 27.
 flabellatus, 27, 38.
Zannichellia palustris, 19.
Eleocharis acicularis, 8.
Scirpus pauciflorus, 8.
 fluitans, 8, 28, 29.
Eriophorum latifolium, 33.
Rhynchospora fusca, 8.
 alba, 32.
Cladium Mariscus, 8.
Carex dioica, 14, 33.
 teretiusecula, 30, 33.
 vulpina, 32.
 muricata, 11.
 divulsa, 38.
 curta, 8, 28.
 Hudsonii, 9, 38.
 aquatilis, 8 (*virescens*), 21.
 limosa, 8, 30.
 irrigua, 39.
 pallescens, 8, 21.
 strigosa, 8, 25, 32.
 sylvatica, 19.
 Hornschuchiana, 8, 36.
 extensa, 28.
 filiformis, 30.
 Pseudo-cyperus, 11.
 paludosa, 28, 33.
 riparia, 28.
Alopecurus pratensis, 33.

- Milium effusum*, 8, 21.
Phleum pratense, 6, 11, 14, 16,
 17, 19, 28.
Agrostis canina, 17, 19.
 alba, 14, 25.
Trisetum flavescens, 16.
Avena pubescens, 30, 32.
Catabrosa aquatica, 8, 16.
Melica uniflora, 9, 10, 19, 25.
Poa nemoralis, 8.
 † *compressa*, †8, 20.
Glyceria plicata, 8, 9, 29, 32, 38.
 aquatica, 8, †27.
 festucæformis, 38.
 Foucaudi, 8.
 maritima, 28.
Festuca rigida, 29.
 Myuros, 27, 31.
 sylvatica, 8.
 elatior, 32.
Bromus asper, 27.
 erectus, *2, 18.
 sterilis, 16, 30, 32.
 * *secalinus*, 2, 8, 20.
 racemosus, 1, 2.
 commutatus, *2.
 mollis, 24.
Brachypodium pinnatum, 3.
 †*Lolium temulentum*, †10, 30.
Agropyron caninum, 19, 28, 29.
 repens, 24, 27.
 pungens, 8.
Agropyron acutum, 8, 21.
Lepturus filiformis, 8.
Adiantum Capillus-Veneris, 17.
Cryptogramme crispa, 20.
Blechnum Spicant, 23.
Asplenium marinum, 8.
Cystopteris fragilis, 11.
Aspidium aculeatum, 27.
Lastrea spinulosa, 38.
Polypodium Phegopteris, 28.
Ophioglossum vulgatum, 6, 27,
 33, 36.
Botrychium Lunaria, 19, 29, 33.
Equisetum maximum, 11, 27,
 28.
 pratense, 33.
 hyemale, 9, 29, 31.
 trachyodon, 2, 9, 33.
 variegatum, 8.
Lycopodium Selago, 8.
 inundatum, 27.
 clavatum, 33.
Isoetes lacustris, 30.
Pilularia globulifera, 2.
Chara aspera desmacantha, 32.
 polyacantha, 2, 9, 30, 38.
 hispida, 32.
 contraria, 8, 32.
 vulgaris, 32.
Tolypella glomerata, 2, 9.
Nitella mucronata, 32.
 flexilis, 30.

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however, being widely scattered, are brought together in the following list. A few earlier items which escaped entry in the Bibliography in "Irish Topographical Botany" have also been included.

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III.

SIXTEEN YEARS' OBSERVATIONS ON THE RELATION
 BETWEEN TEMPERATURE AND RAINFALL AND THE
 SPREAD OF SCARLATINA, MEASLES, AND TYPHOID
 FEVER.

By R. SYDNEY MARSDEN,

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IN endeavouring to trace any connexion between meteorological conditions and the spread of any disease, it is obvious that there are only two circumstances likely to have any effect—first, temperature, and secondly, rainfall or humidity; and with regard to the first, since the temperature curve will always have a maximum in the summer and a minimum in the winter, it seems more important to consider the variations of temperature from the normal condition than the absolute temperature itself.

Exceptional circumstances cannot be explained by ordinary phenomena, and the weekly variations of both temperature and rainfall have therefore been tabulated (from observations taken at the Observatory, Bidston Hill, Birkenhead, in the County of Cheshire), together with the number of cases of scarlatina, measles, and typhoid fever notified to me during the same periods, as Medical Officer of Health for the District.

These weekly variations have been set down in tables for the sixteen years 1890 to 1905, inclusive; and thus we have actual data side by side for forming an opinion on this doubtful though important point, as to whether there is any relation between meteorological conditions and the spread of these diseases in epidemic form.

The relation between rainfall and ground-water and diphtheria has been carefully studied by several observers; and Dr. Arthur

Newsholme¹ has shown pretty conclusively that “diphtheria only becomes epidemic in years in which the rainfall is deficient, and the epidemics are on the largest scale when three or more years of deficient rainfall immediately follow each other.”

Dr. Gresswell has suggested² that not only the rainfall of the year, but also that for prior years, has influence on scarlatina; and Dr. Longstaff showed³ that the increases in the death-rates from scarlatina, erysipelas, puerperal fever, and rheumatism, in England and Wales, occurred in years of deficient rainfall.

In the following table I have put down the total amount of rainfall, the excess of temperature above the normal, and the number of cases of scarlatina, measles, typhoid fever, and diphtheria, occurring in the County Borough of Birkenhead during the years 1890 to 1905, inclusive:—

No.	Year.	Total Rainfall in Inches.	Excess of Temperature in °F over normal.	No. of Wet Days in Year.	Number of cases notified during year.			
					Scarlatina	Measles	Typhoid Fever	Diphtheria
1	1890	26·820	- 0·3	199	247	1620	182	35
2	1891	31·643	- 0·9	194	180	524	197	28
3	1892	33·032	- 1·5	211	218	1542	150	25
4	1893	24·537	+ 1·9	181	421	540	221	77
5	1894	27·912	+ 0·8	202	379	1818	194	133
6	1895	26·265	- 0·8	172	430	258	192	142
7	1896	26·633	+ 1·2	196	606	2166	149	115
8	1897	28·580	+ 0·4	189	630	1141	152	80
9	1898	25·719	+ 1·3	183	643	589	243	190
10	1899	27·807	+ 0·6	186	205	2461	275	86
11	1900	32·054	+ 0·4	208	203	316	163	48
12	1901	25·192	- 0·1	190	266	2179	207	75
13	1902	25·566	- 0·9	200	407	1356	327	114
14	1903	34·418	- 0·1	224	658	420	79	101
15	1904	25·175	- 0·2	196	627	2212	103	97
16	1905	24·011	- 0·1	192	874	979	63	138

Average rainfall for thirty-nine years = 28·613 inches.

Average temperature for thirty-nine years = 49·1° F.

The population of the Borough had increased from 98,143 at midsummer, 1890, to 115,979 at midsummer, 1905. This must be allowed for to a certain extent in comparing the number of cases of infectious diseases notified.

¹ Epidemic Diphtheria. (Swan Sonnenschein & Co., 1900.)

² A Contribution to the Natural History of Scarlatina. (Clarendon Press, 1890.)

³ Studies in Statistics. (Stanford, 1891.)

In the tables and curve-diagrams accompanying this paper, I have shown the weekly variations of temperature and rainfall, and the corresponding number of cases of the infectious diseases mentioned, notified for each week, from 1900 to 1905, inclusive.¹

The results of our inquiry, after a careful examination of the tables and curve-diagrams, are to show—

I. *As regards Scarlatina.*

That there is a rise in the number of cases after there has been deficient rainfall, and the number again falls after rain. Also, that after a series of dry years, the number of cases increases. This bears out Dr. Cresswell's observation, and also that of Dr. Longstaff, "That the death-rate from scarlatina increases in years of deficient rainfall"; as it will naturally follow that, with a large increase in the number of cases occurring, the number of deaths will be likely to rise also. Temperature has apparently little or no influence.

II. *Measles.*

In the case of measles, neither rainfall nor temperature has apparently any influence or anything to do with its spread.

III. *Typhoid Fever.*

Contrary to the well-known views of Von Pettenkofer, the foregoing table shows the number of cases occurring in any one year to be quite independent of the fact as to whether it is a dry or a wet year; but the *weekly* tables and diagram-curves show that there seems to be a *tendency* for the number of cases to fall after rain, and to rise in the dry weather.

The number of typhoid cases dealt with in these tables is, however, too small to generalize on.

It is evident, therefore, that *atmospheric* temperatures have no effect on the spread of these diseases.

I have stated above that scarlatina and diphtheria show a marked resemblance to each other in their method of spreading. Both increase

¹ The tables and graphic diagrams referred to in this paper are preserved in the Library of the Royal Irish Academy, and will be continued and printed in the annual report on the Sanitary Condition of the County Borough of Birkenhead for the year 1906.

after deficient rainfall, and recede after rain ; and both spread more actively after a series of dry years.

How far does the resemblance between them go ?

If we consider how constantly these two diseases are associated together in the same individual ; and, again, how it not infrequently happens that different persons in the same house, or even the same family, will be attacked simultaneously—the one with scarlatina and the other with diphtheria—does it not suggest the possibility that these two diseases may be simply modifications of the same thing ? Or, in other words, may they not be “allotropic forms” (to use a chemical term) of the same disease, as charcoal and the diamond are allotropic forms of carbon ? I think this may possibly be so.

I am indebted to Mr. W. E. Plummer, M.A., F.R.A.S., Director of the Liverpool Observatory, Bidston Hill, Birkenhead, for the particulars respecting the weekly variations of temperature and rainfall contained in the tables ; and to him I tender my best thanks for his courtesy and trouble in the matter.







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IV.

THE COMPOSITION OF A NITROGEN MINERAL WATER
AT ST. EDMUNDSBURY, LUCAN.

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Read JUNE 25. Ordered for Publication JUNE 27. Published JULY 25, 1906.

THE mineral water which forms the subject of this communication rises to within 4 feet from the ground-level in a shallow-built well, which is situate in the demesne of St. Edmundsbury, Lucan, and flows thence in considerable volume into the River Liffey. The water in the well is between 1 and 2 feet deep, and through it large bubbles of gas are to be seen constantly rising from the bottom to the surface, giving it the appearance somewhat of ebullition. The well is marked in the Ordnance maps as the "Boiling Well." It is similarly named in older maps of the eighteenth century. There can be little doubt from its surroundings that the mineral water must formerly have been of some repute.

Some of the loose stones at the bottom of the well are covered with iron rust, as also is the mouth of the outlet from the spring to the river below.

A sample of the gases which are evolved was collected and analyzed. The following results were obtained:—

Nitrogen,	. . . . .	97·9 per cent.
Carbon dioxide,	. . . . .	2·1 ,,

A sample of water was also collected and analyzed for the purpose of ascertaining whether it was fit to be used as a potable water. The results which were obtained are given in the following table, expressed as parts per 100,000 volumes of the water:—

Organic nitrogen,	. . . . .	0·015
Nitrogen as ammonia,	. . . . .	0·009
Nitrogen as nitrates,	. . . . .	0·0
Nitrogen as nitrites,	. . . . .	0·0
Chlorine,	. . . . .	44·8
Total solids,	. . . . .	118·0

The gases, which were dissolved in the water, were also determined. They were as follows, expressed in volumes at 0° C., and 760 mm. bar., per 1000 volumes of the water:—

Carbon dioxide,	140.77
Oxygen,	0.0
Nitrogen,	27.13

A portion of the sample of water was aerated, and kept out of contact with the air, with a view of ascertaining whether it contained any fermentative organic substances. After aeration the dissolved gases had the following composition, expressed as before:—

Carbon dioxide,	122.2
Oxygen,	5.74
Nitrogen,	12.44

The remainder of the aerated portion was kept for three months out of contact with the air, and the composition of the dissolved gases was then found to be practically the same.

It may be gathered from the very small quantity of organic nitrogen which the sample contained, and from the fact that the organic substances which it did contain were non-fermentative, that the sample contained no polluting matters which would render it unfit for potable purposes.

It should be noted that the sample, when collected, was quite clear and colourless, and free from turbidity.

Further samples of the evolved gases, and of the water, were subsequently collected, just previous to heavy rains succeeding a long period of dry weather, and when the autumn season had well advanced. The sample of water was, as before, quite clear and colourless. It yielded the following results on analysis:—

Organic nitrogen,	0.008
Nitrogen as ammonia,	0.014
Nitrogen as nitrates,	0.0
Nitrogen as nitrites,	0.0
Chlorine,	45.87
Total solids,	122.6

The gases dissolved in the water, expressed as before in volumes per 1000 volumes of the water:—

Carbon dioxide,	138.88
Oxygen,	0.34
Nitrogen,	21.18

A portion of this sample, when aerated and kept out of contact with the air for a fortnight, suffered no diminution in the dissolved oxygen.

The foregoing two sets of analyses, when compared, show that the two samples differed but slightly in composition, although they were collected at different seasons of the year.

The water holds in solution an abnormally large volume of nitrogen, fully twice that found at ordinary atmospheric pressures and temperatures.

It is probable that the excess of nitrogen was derived from the fermentative decomposition of nitrates; 1·8 parts nitric nitrogen per 100,000 parts of the water would, on decomposition, yield 14 cc. Nitrogen at 0° C., and 760 mm. bar. If wholly derived from the air, the water must have been subjected to considerable pressure, at least that of two atmospheres. The spring evidently rises from a considerable depth below the surface of the ground, otherwise the water would not retain so much nitrogen in solution.

The fact that after several days of strong frost, and at a time when the temperature of the air was 32° Fahr., that of the water, as it rose to the surface of the well, was 60·5° Fahr., shows that the water is unaffected by surface conditions.

A large volume of the water was collected on the 24th of November, 1904, and a careful quantitative analysis was made of its saline constituents. The results are given in the subjoined table:—

Constituents, expressed as grains per gallon—

Calcium bicarbonate,	35·24
Ferrous bicarbonate,	0·32
Magnesium sulphate,	3·24
Magnesium chloride,	9·38
Sodium chloride,	41·24
Potassium chloride,	0·15
Lithium chloride,	trace
Barium sulphate,	trace
Alumina,	0·11
Silica,	0·53

90·21

It appears from the foregoing results that the water is a mild saline water, and should, I think, prove of value in therapeutic action. This is a question, however, which more properly belongs to the domain of medicine.

V.

NOTE ON THE ACTION OF EMULSINE ON
 β -GLYCOSIDES.

BY HUGH RYAN, D.Sc., F.R.U.I., AND GEORGE EBRILL, B.A.,
Catholic University School of Medicine, Dublin.

Read JUNE 25. Ordered for Publication JUNE 27. Published JULY 25, 1906.

IN a previous communication¹ we have described the syntheses of some glycosides derived from arabinose by the action of phenols and naphthol. Owing to lack of material at the time, we were unable to determine the behaviour of enzymes towards these substances. The method described by us for the preparation of the arabinosides was similar to that previously used for the syntheses of the glucosides of the three cresols, β -naphthol and carvacrol, and of the galactoside of α -naphthol.²

In the latter experiments the glycosides produced were easily hydrolysed by emulsine, and were, therefore, assigned to the β -series. The syntheses of the pentosides being in every respect analogous to those of the β -hexosides, we feel justified in regarding the former as β -compounds, and are supported in this view by the behaviour of α - and β -acetochlorohexoses towards alkaline solutions. In the absence of alkali, an α -acetochlorohexose yields an α -hexoside, and a β -compound gives a β -hexoside; but, in the presence of alkali, both substances yield a β -hexoside. Even if our aceto-chloro-arabinose had been an α -derivative, it should, under the conditions of the experiments, have yielded β -glycosides.

Since members of the β -series are characterised by the ease with which emulsine hydrolyses them, and the only known synthetical glycosides obtained from pentoses and phenols are those got by us, we deemed it essential for the completion of our work to see if emulsine is inactive towards phenolic pentosides. Emil Fischer has already shown that emulsine is inactive towards alcoholic pentosides.

For our purpose, tubes containing aqueous solutions of

¹ Proc. Royal Irish Academy, vol. xxiv., Sec. B., Part iv., p. 379.

² Ryan, Jour. Chem. Soc., 1899, p. 1054; Ryan and Mills, Jour. Chem. Soc., 1901, p. 704.

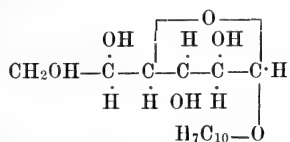
β -ortho cresyl-arabioside, β -carvaeryl-arabioside, β - β -naphthyl-arabioside, and β -phenyl-glucoside, to which emulsine had been added, were kept at a constant temperature of 45° C. for seventy-two hours. The phenyl-glucoside was almost completely converted into phenol and glucose; but, in the case of the arabiosides, although faint odours of carvaerol and cresol could be observed, there was no indication of the presence of even a minute trace of arabiose.

In the following Table we include, for purpose of comparison, all the known synthetical glycosides of the phenols:—

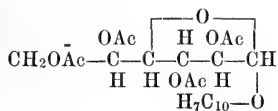
	NAME.	Hydrolysed by Emulsine ?	Synthesised by
A. PENTOSIDES.	β - β -Naphthyl-arabioside, . . .	No.	Ryan and Ebrill.
	β -Ortho cresyl-arabioside, . . .	No.	Rya ⁿ and Ebrill.
	β -Carvaeryl-arabioside, . . .	No.	Ryan and Ebrill.
B. —HEXOCIDUS.	β -Phenyl-glucoside,	Yes.	Michael.
	Tetracetyl- β -phenyl-glucoside, . . .	—	Michael.
	Guaicyl-glucoside,	Yes.	Michael.
	Eugenyl-glucoside,	Yes.	Michael.
	Helicine,	Yes.	Michael.
	Methyl-arbutine,	Yes.	Michael.
	β - α -Naphthyl-glucoside,	Yes.	Drouin.
	β -Thymol-glucoside,	Yes.	Drouin.
	β -Ortho cresyl-glucoside,	Yes.	Ryan.
	Tetracetyl- β -ortho cresyl-glucoside, . . .	No.	Ryan.
	β -Meta cresyl-glucoside,	Yes.	Ryan and Mills.
	Tetracetyl,	—	Ryan.
	β -Para-cresyl-glucoside,	Yes.	Ryan.
	Tetracetyl- ,,	No.	Ryan.
	β - β -Naphthyl-glucoside,	Yes.	Ryan.
	Tetracetyl- ,,	No.	Ryan.
	β -Carvaeryl-glucoside,	Yes.	Ryan.
β - α -Naphthyl-galactoside,	Yes.	Ryan and Mills.	
β -Phenyl-galactoside,	Yes.	Fischer and Armstrong.	
Tetracetyl- ,,	—	Fischer and Armstrong.	
C. DODE- COSIDES.	β -Phenyl-Maltoside,	Yes.	Fischer and Armstrong.
	Heptacetyl- ,,	—	—

Owing to the sparing solubility of the acetyl derivatives of the hexosides in water, the reactions were also tried in dilute alcohol (80 c.c. water + 20 c.c. absolute alcohol); but the glycosides remained unaffected by emulsine. Under the same conditions this enzyme easily hydrolysed amygdaline.

If we examine the above results, we shall see that the activity of emulsine towards a glycoside depends not only on the configuration of the molecule, as Emil Fischer has pointed out, but also on the nature of the groups. Thus the replacement of four hydrogen atoms in β - β -naphthyl-glucoside



by four acetyl radicals



converts a glycoside capable of hydrolysis by emulsine into one which cannot be so hydrolysed.

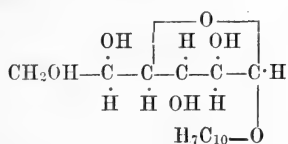
The conversion of the natural glucoside, salicine, into its benzoyl derivative, populine, has a similar effect.

Again, it is obvious that the emulsine test does not hold for all β -glycosides. It holds only for derivatives of fermentable sugars, such as glucose, galactose, and maltose, and does not hold for β -glycosides of non-fermentable sugars, such as arabinose.

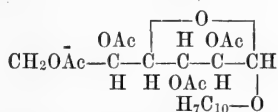


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VI.

ON CONTACT-PHENOMENA AT THE JUNCTION OF
LIAS AND DOLERITE AT PORTRUSH.

By GRENVILLE A. J. COLE, M.R.I.A., F.G.S.,
Professor of Geology in the Royal College of Science for Ireland.

(PLATE II.)

Read NOVEMBER 12. Ordered for Publication NOVEMBER 14.
Published DECEMBER 20, 1906.

THE invasion of the fossiliferous Liassic shales at Portrush, in the County of Antrim, by a basaltic magma of early Cainozoic age, has given rise to features which are famous in the history of geology. Little need now be written on the general physical characters of the junction; but some details have awaited elucidation, and for these, so far as I am aware, the aid of the microscope has not hitherto been called in. Two circumstances attracted me especially to the Portrush rocks. One was the occurrence, in the collections of the Royal College of Science for Ireland, of the original mineral specimens described by Oldham and Portlock¹ some seventy years ago. The second was the discovery by the late Mr. A. V. Jennings,² in 1897, of green soda-pyroxene in a vein associated with the dolerite. During the past five years I have visited the sections at Portrush from time to time, and have gathered the material for microscopic examination which is utilised in the present paper.

James Bryce, jun.,³ in a paper which made its mark, but which remains none too clear in its conclusions, drew attention to the repetition of the two rock-types, the flinty fossiliferous material

¹ Report on the Geology of the County of Londonderry, &c., Board of Ordnance (1843), pp. 99, 150, and 742.

² Irish Naturalist, vol. viii. (1899), p. 64.

³ "An Account of the celebrated Portrush Rock," Journ. Geol. Soc. Dublin, vol. i. (1835), pp. 169 and 173.

and the true basalt, in alternating strata a few inches in thickness, both in the peninsula of Portrush and in the outlying isles, the Skerries. He rightly judged that this interlamination was due to "the injection of one of the rocks into the other." Sir R. Griffith, in an annual address for 1835, which is not published in the Journal of the Geological Society of Dublin, added valuable observations;¹ and Portlock² has given a most valuable literary history of the successive researches on the altered Lias of Portrush. The rock is again described in a memoir published by the Geological Survey of Ireland in 1888.³

Among the minerals described by Oldham in Portlock's memoir, is one referred with doubt to bronzite.⁴ The analysis given is admittedly unserviceable, since the flaky mineral was not separated from the rock. The original specimens, which came from the Portrush peninsula, consist of a dark-grey crystalline type of the altered calcareous shale, with red-brown micaceous plates lying at all angles at one surface. These plates, where they meet on one another, produce the effect of being the bounding planes of solid crystals, just as the mica does in the peridotite known as scyelite.⁵ A mica-lamprophyre sent me by Mr. J. St. J. Phillips, from a dyke at Orlock, Co. Down, shows a similar structure. Another instance is seen in the biotite which has abundantly arisen in an inclusion, probably of sedimentary origin, gathered by me from the granite of Ballymagreehan Quarry, Castlewellan.

My own observations at Portrush have not enabled me to trace the spot whence Portlock's well developed specimens were obtained; but, from the detection of smaller examples, I have no doubt that the crystalline plates hitherto described as bronzite were found close to a junction with the dolerite. A specimen selected for a thin section shows, indeed, a film of dolerite in contact with the altered shale of which the main mass is composed.

In the first place, the flaky mineral is undoubtedly a brown mica. It has the characteristic cleavage and pleochroism, and is practically uniaxial in sections parallel to the cleavage. It arises in certain zones of the altered rock, the larger crystals lying, for instance, at

¹ See abstract in Portlock, *op. cit.*, p. 43.

² *Ibid.*, pp. 37-44.

³ Explanatory Memoir to sheets 7 and 8, p. 18.

⁴ Report on Geol. of Londonderry, &c., p. 742.

⁵ Judd, "Tertiary and older Peridotites of Scotland." *Quart. Journ. Geol. Soc.* London, vol. xli. (1885), p. 402.

various angles in one layer; small crystals, which are virtually colour-spots, occurring in the next layer; and a third layer being practically free from mica. These zones coincide, in the specimens in my hands, with the bedding-planes of the shale; but I suspect that examples will be found where the zonal arrangement will be seen to be parallel to the surface of contact with the intrusive mass, whether this runs along or transverse to the bedding-planes.

In Portlock's specimens, it is not clear if the coarse development of the mica occurred in actual contact with a dolerite sheet, since the specimens are free from igneous matter where the large crystals are displayed. But I think it highly probable that a more massive sheet, or the main igneous mass, lay towards this surface, the mineralising agents of Lévy, the "crystallisers" of Doelter,¹ operating there most freely. For the production of biotite or hornblende, it is now recognised that the presence of some such stimulus is required.²

The brown mica, however, does not represent the first product of metamorphism in the calcareous shale of Portrush. It is well known that the rock has become flinty, and shows the streak of steel when we attempt to scratch it with a knife. This is largely due to the formation of minute grains and prisms of pale yellow-green to yellow-brown pyroxene throughout the ground. Small granules of quartz, apparently also secondary, and sometimes including spherulites of chlorite, occur here and there; there are also a few nests of zeolites; but the essential mineral is pyroxene, which sometimes replaces a whole zone in closely packed and fairly uniform granules. The brown mica in consequence includes granular pyroxene in abundance, and has developed, indeed, first as colour-spots in the interstitial material, and then as more defined crystals, with continuous cleavage-planes, but without proper bounding edges.

In a specimen collected by myself, the mica, so long as it is minute, looks as if it had arisen simultaneously with pyroxene granules of similar size; but this effect is probably deceptive, since all the larger crystals include pyroxene. A black mineral, in feathery aggregates of small rods, with the appearance of magnetite by reflected light, occurs in the zone in which mica is best developed, and also in less degree on either side of it. This suggests rutile; but even in very small prisms it is not translucent.

¹ Petrogenesis (1906), pp. 22 and 24.

² The biotite-calciphyres of Monte Somma are well known. For a small Irish example, see Cole, "On the Geology of Slieve Gallion," *Sci. Trans. R. Dublin Soc.*, vol. vi. (1897), p. 224.

On scratching with a knife, it remains black and lustrous, and is probably an iron-ore, the occurrence of which is determined by some original difference of composition in this particular layer of the stratified series. A similar opaque mineral occurs in plates and granules in Portlock's specimens.

I am unable to determine the minute colourless constituents which fill in the spaces between the prisms and granules of yellow-brown pyroxene. Some are prismatic, like small felspars; others are merely granular. This transparent ground is not affected by hot hydrochloric acid, since the irregular edges of broken fragments of the rock retain their forms, even when examined during the attack by an objective magnifying five hundred diameters. I cannot, therefore, verify the presence of wollastonite, which might very reasonably be expected to occur.

It is, moreover, a coloured pyroxene that has invaded the shell-fragments of the Liassic sediment, not only in the way of an infilling, but also as a replacement of the shells. Oldham¹ long ago noticed a belemnite at Portrush, the cavity of which was occupied by augite; but he regarded this as resulting from an intrusion of the underlying dolerite. We may, at any rate, agree that such mineralisation is due to the direct influence of the dolerite, and perhaps to the inflow of "crystallisers" from it. Aggregates of pale green-brown granular pyroxene, appearing as long bands when the microscopic section is cut transversely to the bedding of the rock, represent in many layers the substance of the well-known fossils of Portrush.

This type of alteration, in the fossils and in the ground, is still conspicuous in a specimen of the flinty Lias, taken from the top-bed of a quarry, where the nearest visible igneous rock lay a metre lower down. Close to the dolerite, the fossils become practically lost. There the micaceous zones also appear. Thus, in the banded specimen particularly studied, and described above in connexion with the "bronzite," the layer nearest the igneous rock consists of abundant pyroxene in a colourless granular ground. The streaky grouping of the pyroxene, when read in the light of less altered specimens of the rock, indicates the former presence of shells. Then follows a zone in which the opaque feathery mineral appears, and the pyroxene granules are smaller. Then a zone in which these small granules are associated with the opaque mineral and brown mica. This passes gradually into the normal pyroxenic flinty rock, which is grey and

¹In Portlock's Report on Geology of Londonderry, &c., p. 150.

less translucent than the preceding zones, and retains clearer traces of organic remains, the pyroxene occurring as an infilling (compare fig. 1). This sequence is seen within a distance of two centimetres.

The whole phenomena of Portrush are, of course, on a small scale when compared with those that occur among the roots of mountains, and on the margins of great laccolites and domes. But they correspond interestingly with those so well described by Lacroix,¹ where fragments of limestone are entombed in basalt near Aubenas, Ardèche. In his figure 8, p. 146, Lacroix shows a zone of augite prisms, embedded in calcite and colourless glass, at the actual contact. The limestone in this case is turned into a very fine-grained mixture of pyroxene and wollastonite, with some isotropic and some opaque particles. Grains of anorthite occur in the isotropic matter. In his figure 9, p. 148, Lacroix shows veins of basalt in the limestone; vitreous matter is abundant, and the basalt itself, by absorption of

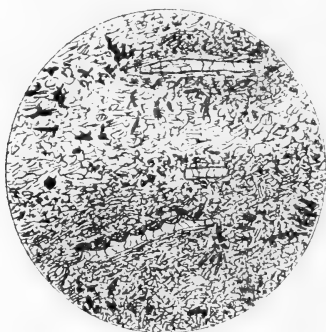


FIG. 1.

Section of altered Liassic shale, small quarry, Portrush. Traces of fossil shells remain, infilled and partly replaced by pyroxene. The paler part of the ground is rich in small plates of brown mica, which occur also in the darker and greyer portion. Minute granules of pyroxene abound throughout. $\times 15$.

the limestone, becomes more vitreous. Later on,² he describes the marginal zone of silicates formed by the mingling of andesite and limestone on the surfaces of inclusions in the lava of Santorin.

¹ *Les Enclaves des roches volcaniques* (1893), p. 141, &c

² *Ibid.*, p. 264.

Various "Kalksilicathornfelse," produced by contact-metamorphism, have been described from time to time;¹ and an interchange of material with the adjacent igneous rock has been usually accepted to account for the variety of minerals formed. The carbon dioxide seems generally driven off and lost.

More appropriate still is a comparison with the Cambrian limestones of Skye, described by Harker,² which have been invaded by Cainozoic gabbro and granite. In one place in the gabbro area, and at another in the granite area, a white bed of minutely granular diopside has replaced a zone of the Cambrian marble. Where chert existed in the latter, as in connexion with sponge-remains, metamorphic silicates are now specially abundant. The crusts of sponges have been replaced by tremolite, while diopside occurs within them, in a granular aggregate of carbonates in which dolomite is predominant.

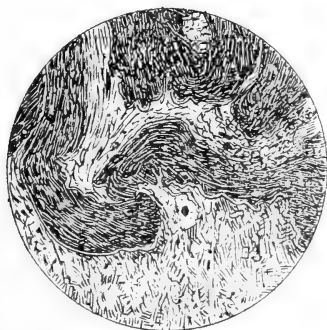


FIG. 2.

Section of junction of fluidal olivine-basalt (darker mass) and Liassic shale (lighter mass), small quarry, Portrush, showing the fusion and intermingling that have gone on in places. The light-coloured band often seen along the actual contact-surface is formed of minute granules of pyroxene, which also abound throughout the altered shale. The basalt contains olivine and rods of feldspar, but is very fine-grained, fluidal, and compact. $\times 15$.

At Portrush, where the basaltic magma has penetrated along the bedding-planes of the calcareous shales in thin sheets, a centimetre

¹ *E.g.*, Fr. Slavik, "Ueber einen Granathornfels von Predazzo," *Centralblatt für Min., &c.*, 1904, p. 661.

² "Tertiary Igneous Rocks of Skye," *Mem. Geol. Survey of United Kingdom* (1904), pp. 146-7.

or so in thickness, considerable interfusion and intermodification of the materials have taken place. The junctions seen in the upper levels of the small quarries on the peninsula frequently suggest an actual melting of the lower portion of the shale. The curved and mammillated under-surface becomes in places not well marked off from the basalt; and microscopic examination shows that the two rocks have "run" in one another (fig. 2). The magma that has given us close at hand the well known ophitic dolerite of Portrush has here cooled as a very fine-grained and grey basalt, with porphyritic crystals of olivine and a few clear felspar prisms, insufficient to form a mesh. The ground between these consists of a very delicate felt of felspar, granular pyroxene, and magnetite, with traces of brown mica on an equally minute scale. Prismatic pyroxene develops freely at the actual junction with the altered shale, but seems to belong as much to the igneous rock as to the sedimentary. Then follows the pyroxenic type of altered Liassic shale. In places the latter has been streaked out, clearly in a viscid state, until it mingles, in a common flow-structure, with its invader.

In another example, also collected by myself, the basalt displays a distinct mesh of felspar, with granular augite, passing towards an ophitic structure; but the microscope reveals in its midst patches of undefined outline, which can be nothing else than partially digested fragments of the calcareous shale. The specimen from which the section was cut shows streaky bands of altered shale, wrapped round by dark olivine-basalt, which is closely commingled with them.

Occasionally a granular mineral, with striking pleochroism, its axis-colours ranging from pale green to rich brown-red, is found in the contact-zone of the shale. In one of Portlock's specimens, this mineral appears also within the dolerite near the junction; but it was developed before the felspar, while the green pyroxene of the same rock arose later than the felspar. From its mode of occurrence in the altered shale, and the occasional inclusions of colourless material in the centre of its granules, I believe this handsomely pleochroic substance to be andalusite. If this be correct, its presence in the dolerite is likely to be due to partial absorption of the shale.

One of the most interesting features suggested by the contact-rocks of Portrush, and by similar instances, is the accumulation of one mineral, in our case pyroxene, to the exclusion of others, in the actual contact-zone within the invaded rock. It is possible that this is due to a selective absorption of certain materials, those that are, *under the special circumstances*, more fusible or more miscible with the

invading magma becoming drained out, as it were, into that magma. In view of the small amount of fusion that has taken place in the invaded rock, the local accumulation cannot well be due to a movement of crystallising material through the calcareous shale towards its margin, as has been argued in the case of lava-basins. The possibility of zoning by selective absorption is supported by a contact of granite and garnet-amphibolite at Castleore near Lough Gill. Here a zone consisting wholly of red garnet appears in one place along the junction. The garnet is like that prevalent in the amphibolite; this latter garnet, moreover, remains in the body of the granite after the other constituents of the complex amphibolite have become absorbed.¹ Lacroix,² in one of his examples from Ardèche, regards a zone consisting entirely of pyroxene as a marginal modification of the invading basalt. In the cases from Portrush, such zones, however, appear to belong partly to the calcareous shale.

Below the junction with the Lias, the invading olivine-basalt shades downwards into olivine-dolerite. The latter, as has been often noted, is cut by numerous subsequent veins of dolerite. Olivine is by no means so common in these; they are also usually coarser in grain and paler in colour than the main mass. Zeolites have arisen in these veins through alteration of the felspar,³ just as is the case in the still more conspicuous veins at Fair Head. The veins often run horizontally along planes of yielding in the main dolerite; then they bend sharply up or down, and proceed again along another horizontal plane. These horizontal veins or sheets are at times faulted by still later veins. There is no reason to assign any appreciable difference in age to these igneous inflows; the veins were, however, clearly influenced by planes of weakness, due to shrinkage, in a mass that was practically consolidated. Where they enter the compacter and basaltic layer, they include fragments of it, just as a granite may include lumps of slate. Though they doubtless represent the upwelling of the last remaining portion of the magma that underlay Portrush, they are subsequent intrusive bodies, and not "segregation-veins" in the old and, I venture to think, somewhat fanciful acceptance of the term. The vertical veins terminate

¹ Other details of absorption in Castleore are given in Cole, "Intrusive Gneiss of Tirerrill and Drumahair," *Proc. R. Irish Acad.*, vol. xxiv., sect. B (1903), p. 364.

² *Les Enclaves des roches volcaniques*, p. 148.

³ Cf. R. B. Young, "An Analcite Diabase and other rocks from Gullane Hill," *Trans. Edin. Geol. Soc.*, vol. viii. (1903), p. 331.

upwards, so far as I have observed, before reaching the zone of altered sediment, as if this flinty layer was already in existence in its metamorphosed state, and provided a tough obstacle, while the basalt below still shrank, settled, and split open.

Sir A. Geikie¹ has carefully described these veins and those at Fair Head, and has urged that the complete dovetailing of the crystals at their edges in between those of the main dolerite shows that the latter rock was still plastic at the period of the intrusion of the veins. A high temperature seems certainly to have prevailed in the invaded mass, since it is difficult otherwise to account for the coarseness of the crystallisation within the veins. But the renewed growth of crystals in an invaded rock, and the interchange of constituents at high temperatures with those of its invader, may cause an interlocking of crystals to arise between rocks of very different ages.²

Sir A. Geikie observed also how the felspar at Portrush is collected in the central part of the veins, the dark constituents being gathered on the margins. To this it may be added that the pyroxene and magnetite are distinctly more conspicuous in the lower part of the horizontal veins, though they are also grouped towards the upper surface. Sometimes the augite crystals grow out in the upper part, where they have more play, approximately at right angles to the surface of the sheet; in the lower zone they are more closely matted together. The marginal aggregation gives us, as it were, a model, in one small sheet after another, of the *Hauptmassiv* and *Grenzfaciesglieder* of Brögger.³ Even in microscopic sections of veinules a millimetre across, traversing fine-grained basalt, it is possible to trace a gathering of granular pyroxene on the margins, representing the first deposit from the magma against the bounding walls. At this stage, then, the conditions were clearly not such as would produce the ordinary ophitic structure. Such marginal differentiation in veins has of course been noted in other areas. Professor R. B. Young⁴ has thus recently described a similar darkening of the sides of small basic veins at Corby Craigs. The gravitational separation towards the lower surface in the Portrush examples is

¹ Ancient Volcanoes of Great Britain, vol. ii., pp. 300 and 303.

² Cf. Cole, "On a Hillside in Donegal," Science Progress in the Twentieth Century, vol. i. (1906), pp. 351 and 353.

³ Die Eruptivgesteine des Kristianiagebietes; I. Die Gesteine der Grorudit-Tinguait-Serie (1894), p. 179.

⁴ *Op. cit.*, Trans. Edin. Geol. Soc., vol. viii., p. 334.

paralleled by the diabase dykes of Electric Peak, described by Iddings.¹ This author refers us with justice to Charles Darwin's² discussion of differentiation in igneous masses through the growth of crystals in a magma of less density. Darwin's view that crystals would in many cases gather towards the bottom of horizontal flows led him, sixty years ago, to one of those philosophic conclusions that have placed him among the greatest and most far-seeing of geological observers.

Finally, in view of Mr. Jennings's specimen from one of the veins of Portrush, with its fine-grained and coarser zones rich in soda-pyroxene, there is clearly room for further research in this well visited and attractive field. A specimen in the Portlock Collection, probably from Portrush and not from Fair Head, shows a zone of soda-pyroxene and plagioclase, forming a rock of dioritic composition, succeeded by a zone of granular dolerite of finer grain, this being succeeded, along an interlocked edge, by a zone of hornblende-plagioclase rock, such as one generally associates with the epidiorite phase. But the hornblende in this case cannot be derived from the pyroxene of the dolerite that is seen in the adjacent zone. Are these zones due to successive intrusion, or to marginal differentiation, or to contact-alteration? Moreover, is the somewhat startling epidiorite or aphanite a stranger brought up solid from the underlying schistose series?

The main dolerite of Portrush shows a felspathic facies in places, in which the felspar is andesine, as determined by Mr. T. Crook and myself. There are thus possibilities of modification in this mass also, on the one hand by marginal differentiation, and on the other by absorption of material met with in its passage from below.

¹ "The eruptive rocks of Electric Peak and Sepulchre Mountain, Yellowstone Park," Twelfth Ann. Rep. U. S. Geol. Survey, Part i. (1891), pp. 584-5.

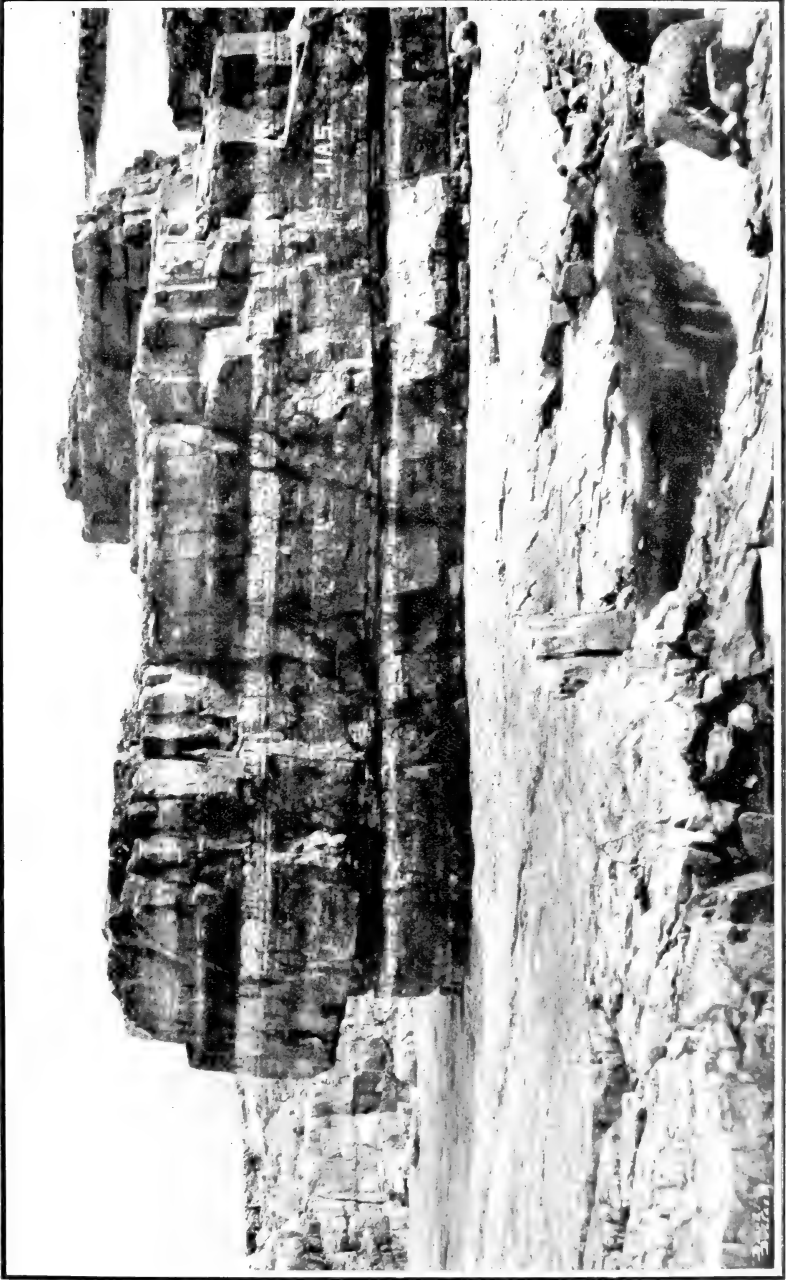
² Observations on Volcanic Islands (1844), Minerva Edition, pp. 243-5.

DESCRIPTION OF PLATE II.

Altered calcareous shale of Liassic age, north shore of peninsula of Portrush.

X The invading sheet of dolerite appears in the right-hand part of the bottom of the picture.

(Photographed by R. WELCH.)



Altered calcareous Liassic Shale, Portrush.

R. Welch, Photo.



VII.

STUDIES IN TUBERCULOSIS.

I.—II.

BY A. E. METTAM, B.Sc., M.R.C.V.S., M.R.I.A.

Read JANUARY 14. Ordered for Publication JANUARY 30.

Published FEBRUARY 11, 1907.

I.—INFECTION OF BOVINES BY THE AVIAN TUBERCLE BACILLUS.

It will be remembered that Koch, at the London Congress on Tuberculosis in 1901, gave as his opinion that the organism of tuberculosis of man was different from that producing tuberculosis in bovines; and he further asserted that the organism found in the lesions of oxen was not pathogenic for man. Since that time much has been done in investigating these statements of Koch; and though it would be rash to say that every tubercle bacillus isolated from lesions of bovines is capable of producing tuberculosis in man, still it would be equally wrong to assert that tubercle bacilli obtained from bovines are in every case innocuous.

For years past it has been recognized that bacilli obtained from mammals differ in their morphological and other characteristics from those isolated from birds; and it has been recognized that the avian bacillus is not so pathogenic for mammals as for birds. Further, it is maintained that mammalian tubercle bacilli are not so pathogenic for birds as those of avian origin. As an experimental fact, we may mention that the guinea-pig resists the avian tubercle bacillus, whilst the rabbit responds, and rapidly so. On the other hand, tubercle bacilli of mammalian origin rapidly cause wasting, lesions, and death in the guinea-pig, but not so certainly in the rabbit.

The tubercle bacillus of mammalian origin grows slowly upon the ordinary laboratory media. The colonies are warty and rugose, dry and scaly. The scales formed of myriads of organisms are broken down with difficulty.

The avian bacillus grows rapidly. The colonies are whitish, fatty in appearance, moist, do not form scales, and the organisms can easily be disassociated.

Both organisms agree in their tinctorial characters, and generally in their microscopic appearances.

The organism I have utilized was isolated by me direct from the liver of a turkey, and has been sub-cultured over a period of two years. It grows readily and well upon the usual media, glycerine blood-serum, glycerine agar, and glycerine potato. It also grows in, and on, bouillon containing 5 per cent. glycerine. It has maintained its pathogenic properties constantly, and apparently without attenuation.

As I was desirous of ascertaining the pathogenicity of the organism I had isolated for bovines, and particularly as I was unacquainted with any recent experiments made with cultures of the avian bacillus upon bovines, I determined to utilize two cattle which I had in my possession. They were submitted to the usual tuberculin test, with the object of determining their freedom from tuberculosis. There was no reaction, and consequently they were declared free from tuberculosis. The animals were a heifer and a young bull, both of the same age, approaching two years. The virus I employed was a culture in bouillon (glycerinated) of the third generation. The heifer received 5 c.c. of the bouillon into the auricular vein, on September 4, 1906. The infection was first attempted into a vein of the left ear; but, the animal moving when the injection was about to be made, the needle left the vein, and a small quantity of the fluid escaped into the tissues. The injection was then made into a vein of the right ear, the quantity being made up to 5 c.c. A fortnight later a small swelling was noticed at the root of the left ear where the first injection had been attempted; but it remained hard and did not suppurate.

On September 25 the animal was noticed to be coughing, and the respirations were slightly increased in frequency. The temperature was 106° F. On succeeding days, until death, the temperature was taken morning and evening. The subject continued to cough. The respirations were hurried, the eyes sank, the animal lost condition, and symptoms of pneumonia supervened. The temperatures recorded are of interest, and I append them:—

	A.M.	P.M.
September 26	104·4	104·2
„ 27	104·6	106·0
„ 28	104·0	105·6
„ 29	104·0	105·8
„ 30	104·8	106·2

		A.M.	P.M.
October	1	105·6	106·0
„	2	104·0	106·2
„	3	104·2	105·6
„	4	104·2	105·8
„	5	104·0	104·8
„	6	104·6	105·0
„	7	104·8	104·6
„	8	104·0	105·0
„	9	104·4.	Killed.

It will be observed that, save on two occasions—on September 26 and October 7—the evening temperature was higher than the morning temperature.

Post-mortem Examination.—There was a local lesion where inoculation had been first attempted, and smears made from it revealed the tubercle bacilli. Sections showed an enormous proliferation of connective tissue around the vein, obliterating it. Caseation had commenced. Tubercle bacilli in enormous numbers were found in the new tissues. The anterior lobes of both lungs showed diffused broncho-pneumonia; the lung-tissue being extensively hepatised. The lesion in the right lung was more extensive than that in the left. The lymphatic glands on the thoracic trachea (tracheal or bronchial) and the post-mediastinal lymphatic glands were greatly enlarged, and contained tubercle bacilli. The spleen, the liver, and kidneys were normal in appearance to the naked eye. No lesions could be discovered in the mesenteric glands; nor were there any appreciable lesions in the cervical lymphatic glands. Examined microscopically, the lungs revealed acute tuberculous broncho-pneumonia. Numerous tubercles, evidently primary tubercles, developed in the pulmonary capillaries were present, as well as alveolar tubercles which had developed secondarily. The alveoli contained well-developed tubercles, in addition to a certain amount of fibrin, red blood-corpuscles, and isolated leucocytes. The alveolar tubercles contained giant cells, and tubercle bacilli were readily found. Microscopic examination of the spleen, liver, and kidneys, demonstrated the presence of young tubercles, as did also examination of the bronchial and mediastinal lymphatic glands. The results of the post-mortem and microscopic examination are similar to the results obtained from the rabbit after infection by the auricular vein, although in the bovine the lesions in the abdominal viscera are not so pronounced.

At the same time, on September 4, 1906, 10 c.c. of the same culture as used in the previous experiment were administered to the bull. The culture was diluted in two Erlenmeyer flasks of ordinary tap-water (240 c.c.), and given by means of the stomach-pump. This method of administration was employed to obviate the risk of the drench passing into the rumen. The lumen of the tube was flushed out with a further quantity of water. The animal had been previously tested with tuberculin, but did not respond.

As the companion animal appeared ill on September 25, the temperature of this animal was also taken; and I append the temperatures for purposes of comparison.

	A.M.	P.M.
September 25	—	104·2
„ 26	102·2	103·0
„ 27	102·0	102·8
„ 28	102·0	102·8
„ 29	101·4	101·8
„ 30	102·0	102·4
October 1	102·6	102·8
„ 2	102·2	102·6
„ 3	102·6	102·0
„ 4	101·8	102·0
„ 5	102·2	103·6
„ 6	102·6	101·8
„ 7	103·0	102·6
„ 8	102·8	103·0
„ 9	101·8	—

The temperature fluctuated more than in perfect health; but still, save on September 25, it was never as high as any temperature recorded in its companion. I determined to apply the tuberculin test after the lapse of a short time. According to von Behring, the tuberculin test should not be applied until after three months had elapsed from date of infection. Any test prior to that is said to be useless, because infection has not been established.

The test I applied fifty days after injection; and it shows that von Behring's statement is incorrect. The tuberculin was injected at 11.30 p.m. on October 24, the temperature at the time of inoculation being 101·8.

The records of temperature upon October 25 are as follows:—

8 a.m.	.	.	102·4	
9 a.m.	.	.	102·0	
11 a.m.	.	.	103·6	
1 p.m.	.	.	104·8	
2.45 p.m.	.	.	106·0	about 15 hours.
4.45 p.m.	.	.	105·6	
6.45 p.m.	.	.	104·8	
9 p.m.	.	.	104·0	
11.30 p.m.	.	.	103·4	
October 26—9 a.m.	.	.	101·2	

A clear and unmistakable reaction had occurred, and the animal was undoubtedly infected by the single dose of the culture. On December 2 the animal received a second dose of tuberculin—a double dose—with the object of ascertaining if there was any precocious reaction to an increased dose, such as Vallée maintains. The injection was made at 12 noon, the temperature at the time being 102·2. At 1.30 it was 103·4; 2.30, 103·6; 3.30, 102·8; 4.30, 103·0; 5.30, 103·2; 6.30, 102·8; 7.30, 104·0; 9.0, 103·8; 11 p.m., 103·8. Next morning the temperature at 9 a.m. was 103·0. I think that there was an undoubted reaction at the seventh hour, but it was not as early as expected. It is probable that a reaction occurred during the early hours of the morning of December 3, but the temperatures are not recorded.

This animal received a further dose of tuberculin on December 18, at midnight, the temperature at time of injection registering 101·2°F. Next day the temperatures were as follows:—9 a.m., 101·8°; 11 a.m., 102·4; 1 p.m., 102·4; 3 p.m., 102·0; 5 p.m., 102·4; 7 p.m., 102·2; December 20, 10 a.m., 102·0. No reaction. The animal was killed on December 20 at noon.

Post-mortem Examination.—The carcass was in fair condition. A small quantity—a few ounces—of fluid escaped from the peritoneal sac on opening the abdomen. The mesenteric lymphatic glands were not enlarged, but the majority showed lesions of tubercle. These lesions were in the cortex of the gland, and varied in size from a pea downwards. They were dry and caseous, but not markedly calcareous. Smears made from the glands and stained for the tubercle bacillus showed a few bacilli, some very short and like diplococci, others apparently degenerating (staining badly, irregular in shape, and in part swollen).

The glands near to the bowel-wall appeared to have borne the brunt of the infection. Those further away in the mesentery were apparently free from lesions. No tuberculous lesion could be found elsewhere.

Inoculation of the caseous material taken from a mesenteric lymphatic gland into a rabbit remained without effect. The rabbit did not develop even a local lesion. The inference, therefore, is that the lesion was innocuous: that the animal had recovered from the infection.

The case is of great interest, because—*first*, a single dose of virus was able to infect; *second*, infection was readily revealed at the fiftieth day by tuberculin; *third*, after the lesion had become sterile, tuberculin gave no reaction, and this again emphasized the value of tuberculin as a diagnostic reagent; *fourth*, it supports the contention that animals recover from infection by virus of low potency. It will be interesting to learn if, as is maintained by Calmette and Guerin, immunity from tuberculosis may be brought about by the use of doses of virus of low virulency given by the alimentary tract.

II.—NOTE ON THE PRESENCE OF TUBERCLES IN THE LACTEALS OF THE VILLI OF THE INTESTINE IN TUBERCULOUS INFECTION.

Infection in tuberculosis, probably in the great majority of cases, is infection by the alimentary tract. This opinion is being forced upon investigators who have paid particular attention to experimental tuberculosis induced by feeding with contaminated or infective materials. In some cases the virus may pass through the mucous membrane of the intestine without producing a visible lesion; at other times necrosis and ulceration of the intestine are established. Probably the explanation of the different results obtained is to be found in the amount and degree of virulence of the infective agent employed. In cases where there are macroscopic lesions there is no difficulty in tracing the course of the virus in the intestinal wall, particularly to the mesenteric lymphatic glands situated in the mesentery. In other cases the blood capillaries may take up the virus, and lesions develop in consequence in the liver, the organ where the virus is first arrested. The point to be ascertained in both forms of infection is how do the bacilli pass through the intestinal mucous membrane. The tubercle bacilli are non-motile and are incapable *per se* of passing through the epithelial covering of the

mucous membrane. They must be conveyed through by some element capable of passing through the epithelium into the lymphatic or blood-vessels. Now, it is a fact that lymphocytes or other forms of leucocytes are frequently passing to and fro through the epithelium into the lacteals placed in the villi of the mucous membrane of the small intestine, or into the lymphoid tissue which forms so large a portion of the structure of the mucous membrane of both small and large intestines. That tubercle bacilli do pass into the lacteals soon after an infective repast is known. Nicolas and Decos found the fluid in the lacteals contained sufficient tubercle bacilli, three hours after an infective repast, to infect a guinea-pig.

Ravenal found the chyle of a dog that had fed on tuberculous material infective four hours after the meal. The tubercle bacilli in both these cases probably gained access to the lacteals through the agency of cells that had phagocyted them. If this is the case, then, doubtless, lesions should be found in the lacteals themselves; tubercles should develop in these lymphatic vessels as elsewhere. I have been fortunate in finding such tubercles. The animal was a rabbit that I fed upon material from a tuberculous mammary gland of a cow. I killed the animal thirty-eight days later. There were extensive lesions of the intestine and especially close to the ileo-cæcal valve, where the mucous membrane was necrotic and ulcerating. Sections of the wall of the gut showed considerable destruction of mucous membrane; but on the edge of the lesion, where the villi were still intact with the epithelium *in situ*, I found tubercles present in the lacteals of the villi. The endothelial lining of the lacteal could be discovered without difficulty. The tubercle itself is composed of epithelioid cells, with some few lymphocytes placed especially at the margin of the tubercle. In one section a giant cell was present. All the characteristic elements of the tubercle are present, epithelioid cells, giant cells, and lymphocytes. The tubercle is precisely of the same character as that developing in, for instance, the pulmonary capillaries or along the course of the lymph in the peri-bronchial or peri-vascular lymphatics of the lungs.



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VIII.

THE RIVER SHANNON: ITS PRESENT COURSE AND
GEOLOGICAL HISTORY.

By J. R. KILROE, H. M. Geological Survey.

[PLATES III.—VI.]

Read JANUARY 28. Ordered for publication FEBRUARY 13.
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THE conditions of the Shannon basin in the last section of the river's course—from Killaloe to the estuary—came under consideration during the recent examination by H. M. Geological Survey of the Limerick area, in 1904; and some references to the drainage were made in the Explanatory Memoir accompanying the published one-inch geological map, recently issued. The narrow limits of the map did not afford justification for a full treatment of the interesting questions involved in the history of the river; and it is here proposed to set forth, in some detail, the facts bearing upon those questions in their geological, physiographic, and economic relations.

In 1862, Professor Jukes, M.A., F.R.S., published, in the Quarterly Journal of the Geological Society, an account of the formation of some of the river-valleys in the south of Ireland, in which reference is made to the Shannon basin and those adjoining it. The author pointed out that the Shannon could not have excavated the ravine at Killaloe after the limestone ground north of Slieve Bernagh and Slieve Arra had reached its present relatively low level. He argued that the Shannon, Barrow, Nore, and Suir must have begun to flow upon a surface high above the present basins of those rivers; that the hypothetical surface was an uplifted plain of marine denudation; and that the rivers maintained their courses while the general surface was lowered by subaërial waste and river-erosion. Different kinds of rock became exposed, which occasioned differential lowering; ridges were thus formed, and, while assuming growing importance, were trenched by the rivers.

Professor Hull, M.A., LL.D., F.R.S., adopted this hypothesis, and points out, in his "Physical Geology of Ireland,"¹ that the valleys through which the Moy, Owenwee, Erne, and other rivers flow outward from the central plain, may be similarly accounted for.

Some interesting items of information are to be gleaned from the Parliamentary Papers on the subject of the Shannon Navigation. The minutes of evidence by Col. John Fox Burgoyne (vol. xvii, 1834, p. 4) deal with the regimen of the river from Lough Allen to Limerick, and set forth the facilities for commercial traffic along the three sections, viz.: The Upper Shannon, comprising the stretch from Lough Allen to Lough Ree; the Middle Shannon, from Lough Ree to Lough Derg; and the Lower Shannon, from Killaloe to Limerick.

Still more interesting information is afforded by the Admiralty Charts, which set forth the soundings of the expansions of the Shannon in considerable detail.

Facilities were in existence prior to 1834 for passing the shallows at Athlone and Killaloe by means of canals and locks; powers formerly possessed by the Board of Inland Navigation had already been transferred to the Board of Works (Ireland), which is in possession of levels of the river-bed at several points; and these data have been kindly placed at my disposal by the officers of the Board of Works, without which any scientific discussion of the physiography would necessarily be incomplete.

The Shannon takes its rise in the townland of Derrylahan, in Cavan—issuing from a deep, roundish hole or pond, which is the outlet of an underground stream. The lakelet is locally known as *Legnashinna*, 345 feet above datum, upon a limestone col, which forms the waterparting between the basins of the Shannon and the Erne.² The limestone is very cavernous, traversed by several underground streams; and the water which issues from *Legnashinna* has been traced to another lakelet, about 1½ mile north-eastward, Lough Garvah (512 feet above datum), which forms a natural reservoir for streams visible and concealed. Tracing these rills still higher, the actual watershed is reached, which, in this locality, is 600 feet above datum.

¹ Sixth edition, 1894, p. 363.

² According to Joyce ("Irish Names of Places," pp. 75, 272, third ed., 1871), Shannon was called *Senos* on Mercator's edition of Ptolemy's Map, 1605. '*Legnashinna*' may be a later Irish form of 'Shannon,' joined with 'leg,' 'a hollow.' Shannon, near Lifford in Donegal, was probably *Shandon*, after 'Sean Dun,' 'Old fort.'

If a zigzag line be drawn along the course of the river southward from the watershed line, omitting the smaller curvatures (see map), the distance to Loop Head and Kerry Head at the Shannon's mouth is 189 miles, or about 175 miles from its source to Kilterdaun Point at Carrigaholt. The drainage-area of the river and its tributaries is 6400 square miles, or about one-fifth of the area of Ireland. The watershed line bounding the basin is indicated on the map, as are also those of the principal adjoining drainage-areas; and the heights of the trigonometrical points through which, or near to which, the watershed passes, as set forth on the Ordnance Map, are also given. The heights on the Ordnance Map, when the line traverses low ground, do not usually give the lowest—though they are nearly the lowest—points separating the Shannon basin from the basins adjoining it, for the points selected for indication of heights in the process of levelling, were some salient features of the ground, usually drift hillocks, in the central plain. The approximately lowest points upon the watershed, as thus shown on the accompanying map, and in tabulated form, are—

WATERSHED LEVELS.

Shannon from Woodford River (branch of Erne),	202 feet.
„ „ Erne,	489 „
„ „ Boyne,	312 „
„ „ Barrow,	261 ¹ „
„ „ Nore,	374 „
„ „ Suir,	444 „
„ „ Blackwater,	385 „
„ „ Corrib, . :	287 „
„ „ Moy,	308 „
„ „ Drumahaire River,	213 „

Submergence of the land to a somewhat greater extent than 180 feet would connect Galway Bay with the Shannon estuary, along the Fergus valley by Gort and Ennis; a lowering of a little more than 200 feet would bring the waters of Donegal Bay into the Shannon basin; and a lowering of more than 260 feet would connect the Irish Sea with the Atlantic, severing the northern half of the island from the southern.

¹ Recorded by Prof. Jukes, F.R.S., Quart. Journ. Geol. Soc., Nov., 1862, p. 379.

A sectional view of the river is given (figs. 1 and 2, Plate IV.), and two lines representing the east and west watersheds—looked at as from the east side. The profiles exhibit the striking variation in levels, of points over which the watershed passes—the heights to which the sandstone hills tower as compared with the slight elevation above the sea and extreme flatness of the limestone plain. The section also exhibits how insignificant is the fall between Lough Allen and the estuary—some 159 feet, most of which is expended at the shallows of Carrick-on-Shannon, Rooskey, Athlone, Meelick, and between Killaloe and Limerick. The extreme flatness of the river between Athlone and Meelick is such that, consequent upon the completion of the Suck Drainage-works in 1892, it was found that the callows along the Shannon *above* the confluence of the Suck at Shannonbridge were much more liable to sudden and frequent floodings than they previously had been. The more rapid discharge of the Suck waters into the Shannon, before ordinary extra water had time to pass away, had the effect of modifying the regimen of the main stream to an extent which resulted in an action at law.¹

The waters of Lough Ree stood some 10 feet higher within recent times than they now do, as proved by evidence of solution, with undercutting of limestone blocks, to be seen about five miles north-west of Athlone, close to the railway, in the townland of Cornaseer. Under these conditions the lake must have been, perhaps, twice its width, and for a considerable period. Its ancient surface-level is clearly indicated by the caps of the mushroom-shaped blocks.

The average rainfall in the Shannon basin, calculated for a period of thirty years (1870 to 1899) is as follows:—

At Broadford in Clare,	33·50 inches.
„, Birr Castle,	33·06 „
„, Mullingar,	36·50 ² „
„, Ahascragh,	40·40 ² „
	Average for four stations,
	35·86 „

The stations in question are all at a low level; if we had records from some in the hilly regions of Lough Allen and around Lough

¹ La Touche *versus* The Suck Drainage Board.

² Rainfall at these stations was in part computed, observations there not extending over the full term of thirty years.

Derg, the average would doubtless be higher. We may take it roughly as 36 inches for the entire basin.

Prestwich calculated, from the observations of Harrison for eleven years, and from those of Beardmore for eighteen years, that the Thames discharge at Kingston averages 1,250,000,000 gallons daily, from 3670 square miles, which is equivalent to 8 inches per annum.¹ The average annual rainfall is 27 inches, so that the discharge is somewhat more than *one-third*. The Severn discharges 1,600,000,000 gallons for 3890 square miles above Gloucester, equivalent to 10 inches of rainfall. The average record here is 40 inches, so that the discharge in this case is about *one-fourth*. For the purpose of comparing these two areas and their discharges with those of the Shannon, it may further be stated that about two-thirds of the Thames basin is occupied by permeable strata; and it is to be expected that the proportion of water evaporated therefrom would in the aggregate be less proportionately than from the surface of the Severn basin, formed for the most part of impermeable strata. The proportion of the rainfall evaporated in the latter case is greater than in the former, and the discharge consequently less in proportion to the rainfall. In the case of the Shannon the evaporation must be very great, because of the numerous lakes, marshes, peat-bogs, and protracted water-flow, in streams and tributaries, within the low-lying, comparatively flat basin.² We do not, therefore, greatly err in comparing the circumstances determining the proportionate discharge of the Shannon with those of the Severn rather than those of the Thames, and in estimating the Shannon discharge as about *one-fourth* of the rainfall, that is to say, 9 inches per annum.

Analyses of the Shannon water, as carried out by Sir Charles

¹ "Anniversary Address," Quart. Journ. Geol. Soc., vol. xxviii., 1872.

² Mr. R. H. Scott, F.R.S., thought that the evaporation from a *free-water surface* about equals the rainfall. Mr. C. Greaves, C.E., found that on an average of fourteen years—1860–1873—the rainfall of London was 25·721 inches and the evaporation 20·613, and that in three distinct years the evaporation exceeded the rainfall; and the late Dr. Haughton, F.R.S., ascertained that on the average of two years in Dublin, the evaporation fell short of the rainfall by only 1·08 inch.—"Elementary Meteorology," by R. H. Scott, F.R.S., 6th edition, p. 102. The Rothamsted averages for seven years—1870–1877—were 30·26 inches of rainfall; and

Evaporated from or retained by soil (a clay-loam),	20 inches deep,	17·97 inches.
" "	" "	40 " "
" "	" "	60 " "
		17·47 inches.
		17·40 inches.

Cameron for the Limerick Corporation, yielded the following results as kindly supplied to the author:—

SHANNON WATER.

COMPOSITION OF SPECIMEN OF WATER ANALYSED FOR
LIMERICK CORPORATION.

One Imperial gallon (70,000 grains) contains in grains marked:—

Total solid matters,	21·000
Including:—	
Albuminoid ammonia,	0·012
Saline ammonia,	0·004
Nitrous acid,	none.
Nitric acid,	trace.
Chlorine,	1·093
Sulphuric acid,	1·4412
Equal to calcium sulphate,	2·0000
Phosphoric acid,	none.
Colour, looked at through a tube 2 feet long, ..	deep yellow.
Odour, 100° F.,	none.
Suspended particles,	few minute.
Turbidity,	very slight.
Sediment,	very slight.
Microscopic examination,	Moderate numbers of micro-organisms present.

These are fairly good waters of the peaty class.

CHARLES A. CAMERON.

According to Prestwich, the waters of the Thames give of solid matter 20·48 grains per gallon. Litheby, Odling, and Abel showed that unfiltered waters of the Thames above Kingston give 20·82 of solid residues. Prestwich calculated his average from these figures as 20·68, of which he takes 1·60 to be suspended organic matter; and by deducting this latter amount from the gross solid residue, he obtained 19 grains as representing the inorganic or mineral matter carried off by the Thames annual discharge at Kingston. The Thames water at London contains 33 parts in every 100,000,¹ corresponding to 23·1 grains per gallon. The water here contains salts² and organic matter washed from the ground and atmosphere of so populous an area; and, making allowance for these, the mineral portion of the residue derived from the basin would probably not greatly differ from the amount per gallon obtained at Kingston. Returning to the figures obtained for

¹ "Text-Book of Geology," by Sir A. Geikie, D.C.L., LL.D., F.R.S., &c., 4th edition, p. 489.

² Salts of ammonia, &c.

the Shannon water, and making a deduction for the trifling organic substances present, 20 grains of mineral matter per gallon, out of 21 grains of solid stated in the results of analyses, would seem to be a fair estimate. The analysis was recorded in June, and might be slightly different from the average obtainable for the year. It is higher than for the Thames water at Kingston, as might be expected, for the Shannon area is for the most part limestone, and organic acids derived from the peat of the vast tracts of bog would operate powerfully on this rock. An estimate of 20 grains per gallon of mineral matter does not err, however, on the major side, for an average was obtained by Bischof for a number of rivers containing very small and very large quantities of mineral matters, and is given by Sir A. Geikie as 21 parts in 100,000, whereof 11·34 parts were carbonate of lime.¹

Twenty grains per gallon represents about 1,000,000 tons per annum, conveyed to the sea from the entire Shannon area, equivalent to 2740 tons for an average daily discharge of solid matter.

Taking the Shannon yearly discharge to be approximately 9 inches off each square inch of the drainage area, and 20 grains of mineral matter to be carried away in each gallon, then in every 100 years an average of 3·246 gallons flows off each square inch of surface, carrying 64·92 grains of mineral matter. If we assume the rock affected and eroded to be in great part somewhat earthy limestone, of 2·65 specific gravity, the matter borne away would approximately total $\frac{1}{10}$ th inch, about ·3 foot in a century.² Lowering of the surface at this rate would be one foot in 12,000 years. The lowering of England and Wales was estimated to have been one foot in 12,978 years.

It will be shown that a differential lowering of some 2500 feet has taken place over most of the area now occupied by limestone in Shannon basin since the commencement of the river's history; which, upon the basis of one foot in 12,500 years, or nearly 13,000 years according to Mellard Reade's estimate, would have necessitated a total period of erosion of more than 30,000,000 years. Such a figure seems extravagantly high, particularly if, as we believe, the initiation of the river-basin dates no further back in geological time than the Miocene epoch. We must infer that the conditions of subaërial denudation have been different in the past, including perhaps a much greater

¹ Bischof, Chem. Geol. i. chap. v., quoted by Sir A. Geikie, *op. cit.*, p. 488.

² Mr. Mellard Reade's estimate for the general surface of England and Wales, where not half the area is limestone, was ·0077 foot per century.—Transactions of the Liverpool Geol. Soc., 1882.

annual rainfall than the present; or that the area presented strata much more easily denuded than limestone. With regard to this latter alternative, there must have been a period during the formation of the basin when the area affected was formed of non-calcareous strata—those of the Pendleside, Millstone Grit, and Coal-measures series—and therefore *less* easily removable than limestone. The denudation of these members, however, may have preceded the Cretaceous period; and the hollows may have been since filled with more soluble and friable strata. Even this supposition, however, does not help to diminish materially the period necessary for erosion, on the assumption of uniform operation; for the Thames drains an area consisting almost entirely of Secondary strata, and some Tertiary—just such as might have covered Ireland while the Shannon basin was to some extent being formed; yet the present rate of waste of the Thames area is comparable to that of the Shannon area. The calculations, therefore, lead us to regard the forces producing denudation as variable, or as having acted much more vigorously at some periods than at others. This agrees entirely with the conclusion arrived at by students of subterranean as well as superficial erosion.¹ If we take even half the time calculated and set down—15,000,000 years—as the time expended in the denudation of Ireland, including the sculpturing of the present physical features, and the severance of the island from Great Britain, it seems a very long period when we think of the small proportion it must hold to the æons necessary for the filling up of the entire geological record.

We have an irrefutable argument presented in at least two Irish regions, for the post-Eocene age of the present surface features of Ireland. One is the existence of the Mourne group of hills, which consist in large part, and from summits almost to base, of Tertiary granite²; the other is the occurrence of a dyke of Tertiary basalt which may be traced across the top of Errigal (2466 feet). Both of these igneous intrusions must have invaded strata at least on a

¹ See Martel's data in "Spelunca," vol. vi., 1906. Later on in the present paper a probable cause is suggested by which the presumed vast duration of the processes of waste may have been considerably curtailed.

² For the Tertiary age of the Mourne granites, see "Ancient Volcanoes of Great Britain," by Sir A. Geikie, D.C.L., F.R.S., vol. ii., p. 421. They probably belong to the same general epoch as the Antrim basalts—shown to be Eocene by Mr. J. Starkie Gardner, F.L.S., F.G.S., &c., Quart. Journ. Geol. Soc., vol. xii. (1885), p. 82. The dyke of basalt across Errigal was traced by the present writer.

level with the highest points of the hills, the strata having since been removed from the deep adjacent valleys, and from the neighbouring low ground stretching away at foot from the hilly tracts. The very low summits touched by the watershed between the Shannon basin and that of the Woodford river—tributary of the Erne—have already been referred to. The ground separating the Erne basin from the general basin of the Blackwater, Bann, and Lagan, adjoining the Mourne group, is almost equally low; and from these facts we may conclude that the differential lowering of the ground stretching between the Donegal and Down hills synchronized with the lowering of the Shannon basin, and indeed of the whole central plain: thus, the formation of this basin involves the larger question of the denudation of the entire island. No reason can be advanced to show why the moulding of the features in the southern half of Ireland has not been contemporaneous with that of features in the northern half; and it is a very noticeable fact that the summits of the highest hills in the chief Irish groups lie approximately upon a plane 2500 to 3000 feet above present datum level, as may be seen from the following list, viz. :—

1.	In the Donegal group,	Errigal	stands at	2466 feet.
2.	„ „ „	Muckish	„	2197 „
3.	„ Sperrin „	Sawel	„	2240 „
4.	„ Mourne „	Slieve Donard	„	2796 „
5.	„ „ „	Slieve Bingian	„	2449 „
6.	„ North Mayo „	Nephtin	„	2646 „
7.	„ „ „	Slieve Cor	„	2369 „
8.	„ South Mayo „	Croagh Patrick	„	2510 „
9.	„ „ „	Mweelrea	„	2688 „
10.	„ Galway „	Formnamore	„	2239 „
11.	„ „ „	Bennabeola	„	2336 „
12.	„ „ „	Benbawn	„	2395 „
13.	„ Leinster „	Lugnaquilla	„	3039 „
14.	„ „ „	Kippure	„	2473 „
15.	„ Magillicuddy „	Carrantuohill	„	3414 „
16.	„ „ „	Mangerton	„	2756 „
17.	„ Galtee „	Galtymore	„	3015 „
18.	„ Knockmealdown „	The Summit	„	2609 „
19.	„ Comeragh „	Knockanaffrin	„	2478 „

When the circumstances of this coincidence are considered, it is even more remarkable than at first sight appears; 1, 2, 6, 7, 8, 11, and 12 being quartzite; 3 mica schist, 13 cleaved felsite¹ over granite; 4, 5,

¹ As recently ascertained by Mr. M·Henry of the Geological Survey.

and 14, granite; 9 and 10 Silurian grits; and the last four, of Old Red Sandstone strata. It cannot be regarded as a mere coincidence that hill-summits formed of rocks of such different natures could all range upon or approximate to a plane; and it is therefore probable that in the summits of the mountain groups we have the vestiges of a great plain of denudation, such as was postulated in 1862 by Professor Jukes. That authority, as already noted, believed the plain to have been one due to marine erosion; and Professor Hull concurred in the belief, which he extended so far as to attribute the existence of plains found at lower levels in the interior to the same origin. It is not easy to see why this hypothesis should not be accepted, at least for the original plain upon which the Shannon commenced to run in Tertiary times; but I did not think the hypothesis could apply in the case of the lower planes connecting certain hill-tops in the interior, since it would have to be supposed that the causes which produced them—the erosion of ocean-waves and currents—left the outworks, the higher grounds around the island, unaffected; and this throughout the long period necessary for the formation of the plains within.

The work of Mr. W. M. Davis, in America, tends to veto the above hypothesis in so far as marine erosion is supposed to be the agent which produced the plain. He shows that sub-aërial waste, operating upon an uplifted area, retained at a certain level, can do precisely the work with which marine erosion has been credited.¹ This hypothesis, moreover, in the case of Ireland, would account for the existence of plains at lower levels—produced, let us say, where similarity of conditions prevailed. And, as against the previous hypothesis, it may be mentioned that it is likely the denudation which formed the great Irish plain commenced when the land showed itself above the Miocene sea, rather than when it was sinking. The great Cardigan bulge, which initiated the drainage directions in Wales, took place when the land was emerging; and this was probably concurrent with the intrusion of the Mourne granophyres, accompanied by bulging of the invaded Silurian strata, which must have been cleared away to expose the summit of Slieve Donard, prior, as we have seen, to the initiation of the Shannon. If, according to this reasoning, the ancient great plain of Ireland was formed during emergence, this would have been an unfavourable condition for the formation of the plain by marine erosion, and would tell in favour of

¹ "Physical Geography," by William Morris Davis, 1899. The plains in question the author terms "penepains," p. 152.

the sub-aërial hypothesis. The chief objection to this hypothesis seems to be the length of time since the Miocene epoch—comparable, say, to 15,000,000 years—which would have to be added to that already calculated for the differential lowering of the surface. A diagram of the Irish mountain groups, and the plain passing through the chief summits, is shown to illustrate the remarkable conditions just explained (Plate IV., fig. 3).

On referring to the diagram it will be noticed that the general level of the hill-tops stands somewhat higher in the south of Ireland than in the north, which would be all the more remarkable if the hypothetical plane were originally approximately parallel to the present datum plane; for the mountain summits of the south are chiefly Old Red Sandstone, and probably more easily denuded than the granites and quartzites of the northern summits. It is likely, therefore, that a slight tilting upward has occurred in the south, since the flow of the Shannon commenced—a tilting which, in an angular measurement, might be reckoned in minutes rather than degrees. It could not, for any prolonged period, have been greater than 1 in 2,500,¹ else the waters of Lough Allen and Lough Ree would permanently flow off by the Erne valley. An uptilt in the east of 300 feet in 70 miles would have sent those waters into Galway Bay, and one in the west of 261 feet in 60 miles would have sent them into the Barrow basin; while an almost imperceptible sag in the Shannon basin itself would convert it into an arm of the sea. The existing conditions, therefore, seem remarkably stable, and probably entitle us to infer a high degree of *rigidity* for the crust in this western part of the British region, throughout later Tertiary and recent times—though it be fully recognised that *oscillations of level* in regard to the whole island have occurred.

The conditions above described, as well as the regularity of geological boundaries at the entrances to the Shannon gorge, north of Killaloe, afford disproof of any local crust-movements, such as convulsive rents, &c., which might be supposed to have formed the gorge; and the stability and prolonged continuance of those conditions warrant our reference to the drainage systems of Wales, the neighbouring portion of the British region. These are discussed in an elaborate paper read before the Geological Society by Mr. Aubrey Strahan, M.A., F.R.S., in May, 1902,² the facts and conclusions of

¹ 202 feet, in say 90 miles, is the present slope from the Woodford River to the north coast-line.

² Quart. Journ. Geol. Soc., vol. lviii., part ii., p. 213.

which may be briefly summarised as follows, in so far as they aid us in the present inquiry:—

1. The surface of the region affords proof of a prolonged Continental epoch—following “a movement characterized by folding and overthrusting” with east and west axes,¹ “essentially of an elevatory type,” which “was the direct cause of enormous denudation between Carboniferous and Triassic times.” So far as Mr. Strahan could recognize, no valleys eroded by the drainage of this period can now be pointed to. This was followed by—

2. A period of submergence, with the piling up of Upper Cretaceous strata to such a thickness as would, if at present existing, cover all Wales, except a small area about Snowdon. “All the features in the Palæozoic strata were blanketed over”; and the elevation into land of the Secondary (and possibly early Tertiary) strata became the occasion of the new river-systems which adjusted themselves with complete disregard to the older valleys and ridges.

3. The direction of these Tertiary river-systems was determined by a north-east and south-west bulge in the region of Cardiganshire—that is, an anticlinal axis in the direction of the ancient Caledonian foldings, and of post-Oligocene and pre-Pliocene date.

In the case of Ireland much could be said regarding the surface upon which Upper Old Red Sandstone and Carboniferous rocks were laid down, that is regarding denudation in Devonian times; and it is remarkable how little we know concerning the results of denudation during the “great Continental epoch” of post-Carboniferous, pre-Triassic period. We know that the Carboniferous strata had been almost entirely cleared away from part of the area in the north-east of Ireland, where New Red Sandstone and New Red Marl now exist; and as the part referred to falls within lines roughly drawn from the Head of Strangford Lough and from Cushendall, to Kingscourt as apex of a triangle, this area may, perhaps, be suggestive of a shallow pre-Triassic bay—a hollow resulting from river-denudation. The clearing away of Carboniferous rocks from parts still further west may be due to later denudation.

The existence of Triassic rocks clothing denuded Silurian and Carboniferous strata alike, their uniformity in character, the apparent sequence of strata upward through Lias to Cretaceous, and the

¹ The Hercynian of Bertrand (Bulletin, Soc. Géol. de France, series 3, tome xvi., p. 570), the Armorican of Lapworth.

aggregate thickness of these rocks may imply a great extension westward of the Secondary formations. If we bear in mind the conditions which are believed to have existed in Wales, all this western part of the British area may have borne a garment of Secondary rocks, if not also some of Tertiary date. The gaps in our Irish records, however—the absence of great groups, Oolitic and Lower Cretaceous, for example—suggests the necessity for caution, in conjecturing a general extension and substantial thickness of these rocks over Ireland; indeed whether the Secondary formations were ever represented in force in the Shannon area may always remain an open question. No trace of them has been reported, even in the glacial drifts of this region.¹ If they did exist, they may have been cleared away while the plain of denudation was being formed, prior to the initiation of the Shannon basin. The depth at which Wales must have lain to admit of the country being almost covered with Cretaceous strata, as Mr. Strahan states, and the proximity of Wales to present Irish land, may imply that Cretaceous strata also covered a large part of our area. We cannot say that any of it was covered with ocean water in the Eocene period; but the existence of land during that period in the present north-east corner can scarcely be used as an argument to the contrary, for this tract may have been exceptional, and have subsided subsequently to the volcanic activity which, for the time, prevailed in the region.

The ground, then, upon which the present drainage originated was probably formed for the most part of Palæozoic strata, including considerable areas of the Upper Carboniferous strata, partly of Secondary, and possibly in part of Tertiary. The crust-movements later than the Eocene epoch have not affected the directions of any of the Irish rivers, those at least in the middle of the country. The direction of the Erne was probably determined by a N. N. W. line of weakness, of Charnian direction and date—to use Professor Lapworth's term for the system of dislocations and fissures of Tertiary age. The N. N. W. trend of the valley is that of a great Tertiary basalt dyke, some 100 yards in width, which I traced in 1883 along the eastern side of Upper Lough Erne.² An instance of pre-Carboniferous erosion with the formation of a gap filled, subsequently, with limestone occurs in

¹ A chalk-flint pebble which I picked up from the Shannon alluvial deposits, south of Castleconnell, may testify to the wide distribution of northern drifts rather than to the recent existence of chalk *in situ* in the Shannon basin.

² Explanation of Sheet 57 of the Geological Survey Maps, p. 16.

the Shannon basin, where the river-course happened by chance to find its way through an ancient valley at Rooskey.

The Killaloe gorge presents no indication of having been formed to any extent in pre-Carboniferous times, though valleys on both sides of the group pierced by the gorge seem to have been eroded at that early date; and the continuance of the Shannon course across the group, irrespective of the previously-formed and re-filled valley on either side, shows that the obliteration or possible blanketing over of prominences in pre-Tertiary times must have been perfect. The deflection of the river to the west, however, before it reached the intensely-folded region of Cork and south Limerick, proves that those Hercynian disturbances probably occasioned the existence of somewhat higher or less easily eroded ground, *there*, than that which lay northward, along the infant Shannon basin. It is when we look closely into the form of the river-bed in the vicinity of Killaloe that the most difficult and interesting questions arise.

Until the last twelve months I had strenuously maintained that the river-bed has been formed entirely by ordinary current-action, and solution. When studying the Lough Derg soundings, however, I perceived that ordinary river-erosion could not produce a bed of the shape indicated: reference to sections is here invited (Plate IV., fig. 2, already noticed, and Plate V.).

It will be perceived that instead of the river being shallow over the unyielding Silurian slate-rock, set almost vertically, and striking across the river-course, it is deeper than over the limestone of Lough Derg, and much deeper than over the comparatively easily eroded Old Red Sandstone at Killaloe. The river-bed actually drops below the datum line above the town, while at the town it is 100 feet above datum. Old Red Sandstone strata are here to be seen in the river-bank, and Silurian rocks *in situ* in its bed. A barrier is thus formed, partly of Silurian, and partly of Old Red Sandstone rocks, which without the artificial impounding weir would retain the waters of Lough Derg to a depth of some 104 feet opposite Derrycastle—two miles above Killaloe. One might have expected to find a fairly level shallow bed from Killaloe northward, a sudden drop from slate-rock to the sandstone floor, and a pronounced wide, well-formed valley in the limestone district southward to Limerick. None of these elements exist; instead, we have the formidable barrier at Killaloe, naturally damming up a considerable depth of water in Lough Derg, and the river falling away southward by a series of rapids which correspond with drops in the canal, south of

O'Briensbridge¹ (Plate V.), along an alternative course, possibly one used by a branch of the Shannon.² There is no evidence of back-cutting upward from Limerick, such as might be expected along this important water-way; and the points and directions in which the tributaries from the high grounds on each side here join it are not in harmony with the circumstances which might be looked for in a long-established river-system. Thus, under existing conditions the Newport and Annagh Rivers form a system with a pronounced valley, independently of the Shannon, instead of being directly tributary. They turn sharply southward a few miles to the east of the main stream, and are tributary only after joining the Mulkear, which empties into the Shannon somewhat *against its current*. Again, the latest glaciation was effected by an ice-sheet which moved over the Cratloe hills, probably from the high grounds in west Clare, and fanned out eastward at Castleconnell to south-eastward at Limerick without being in the least affected in direction by the Shannon valley. In consideration of these unwonted circumstances, and having discovered what seems to me a reasonable means of accounting for an intermission of the Shannon erosion in this locality, I cannot hesitate to see in the new appearance of its course a strong suggestion of the river not having occupied it for a time at least; that, in fact, the river is, in a sense, a recent visitant there—a monarch returned, after a long absence, to a part of his dominions which by force of circumstances he had abandoned.

There is little doubt that the gorge above Killaloe owed its origin to river-erosion, until a *late stage* in its history. This is the view maintained throughout the present paper.¹ With regard, however, to the *latest* stages, I would here submit:—

1st. That, prior to these latest stages, the river-erosion of the gap at length failed to keep pace with the comparatively rapid lowering of the ground to the north, where solution of the limestone allowed of the outspreading of Lough Derg, until the water found an easier alternative line of discharge through the Scarriff valley, by which it again reached the estuary, and kept the Kilrush gap open.

¹ And not very different from the general southerly slope of the ground.

² Mr. Geo. W. Lamplugh, F.R.S., &c., who first noted the singularly *new* appearance of the Shannon course below Killaloe, considered that it might originally have taken the line indicated above, that is by Clonlara, rather than by Castleconnell.

³ Notwithstanding comparisons with valley-formation by ice-erosion referred to later on.

2nd. That the all but latest stage of erosion in the gorge was effected by glacial action, which alone could have caused the abnormal deepening of the bed, as at present.

3rd. That upon the melting of the glacier which filled the gap, the river was slightly deflected from its original course by moraine matter at Killaloe; and, south of Birdhill, it encountered the moraines formed during earlier melting of the glacier, which diverted its flow opposite O'Briensbridge into its present channel. Had the moraines not existed, the river would probably have flowed directly southward and entered the flat tract now filled with peat and alluvium, where it would have been joined directly and normally by the Newport and Annagh rivers.

First, with regard to the comparative heights of the valley of probable discharge by Scarriff at the lowest point, and of the bed at Killaloe, the water-level in Loughanillon near the watershed, and of the sluggish Cloghan river¹ which drains it, is 133 feet. The watershed line passes over a low drift parting between that lakelet and Lough Bridget, which has a surface-level of 115 feet. The rock-floor beneath the ridge, and forming the river and lake bottoms, would no doubt be considerably nearer to the 100-feet level, that of the present natural point of escape at Killaloe; and, as we shall have to take account of great ice-erosion in the gorge, which must have considerably lowered this point of discharge below the level at which it probably stood in pre-glacial times, there can be little question that the Scarriff valley formed the presumed alternative course for Lough Derg water prior to that erosion. In the section referred to on page 92, the heavy dash-dot line might possibly be supposed to be the bottom of a U valley formed by a certain late stage of glaciation—from 160 to 230 feet above present datum. The rates of lowering of valleys by glaciation have been estimated at 2 c.m. to 3 c.m. per year in the Alps, and the time taken for the formation of some of the principal valleys has been calculated at 50,000 to 70,000 years, or 12,500 years for the latest stage of glaciation.² If we take half the lesser rate, and suppose the erosion to have continued 12,500 years, the river bottom at Killaloe might have been lowered even more than to its present level in this time.

¹ With a fall of four feet in three miles, towards Scarriff, emptying into Lough Derg. The water south-west of Loughanillon flows towards the Shannon estuary.

² *Die Gletscher*, by Dr. Hans Hess, pp. 187, 376-7.

The passage of a glacier through the gap is a factor in this interesting problem which cannot be omitted, to which in fact much importance attaches. The abnormal deepening of the channel just within the *embouchure* is almost absolute proof of its operation. For corroboration and illustration we may refer to a standard instance treated of by Dr. Hans Hess¹—that of Lake Iseo, in Lombardy. This lake, about $12\frac{1}{2}$ miles in length, by $2\frac{1}{2}$ miles in width, and 172 miles from the sea, is a rock-basin, with surface-level 185 metres above sea-level, and more than 235 m. in depth: that is, its bottom lies more than 50 m. below the present sea-level. Dr. Hess has been good enough to send me a traced map of this interesting lake, with figures indicating surface-level and soundings as given above. He has no hesitation in attributing its formation to glacial erosion; in fact, he regards the present valley-bottom as but a result of the latest stage of the gouging action of glaciers, which successively occupied and formed the entire valley. To this point it will be necessary to return, noting here the two principal points for which this illustrative instance is brought forward:—1st, that a glacier has power to produce, near the *embouchure* of a valley, a remarkable deepening of the river draining it, which could scarcely under the circumstances of the Shannon gorge be attributed to water-erosion; 2ndly, that deepest water hugs the concave side of the lake, where the ice-stream turns westward in its course.

The internal structure of glaciers, as described by Agassiz, Forbes, Tyndall, and more recently by Hess, Chamberlin, Salisbury, and others, especially the spoon-shaped curving of planes of deposition frequently assumed at glacier-ends, is strongly suggestive of scooping action, such as would account for the hollowing of valley-bottoms near their *embouchures*. A view of the Brenva glacier of the Mont Blanc group is given by Hess,² and an ideal section through the centre of a glacier³ along its course, in both of which the upturning of the layers of deposition at the glacier end is clearly shown. Chamberlin and Salisbury⁴ also refer to this feature, and give instances: for example, the glacier on the south side of Orliks Bay, and that of Bowdoin in North Greenland. They, moreover, write as follows:—“It is merely necessary to assume that the gravity of the accumulated mass is sufficient to produce minute temporary liquefaction at the points of

¹ *Op. cit.*, p. 356, and plates.

² *Op. cit.*, p. 169.

³ *Op. cit.*, p. 336.

⁴ *Geology*, vol. i., Physical Processes, pp. 281, 300, and 303.

greatest stresses" to bring about bending and even crumpling and shearing such as they illustrate.

Perhaps it is not necessary to suppose liquefaction; the fracture and re-arrangement of ice-crystals under different degrees of pressure in the mass would seem quite capable of accounting for the bending. Hess appeals to Tresca's experiments regarding the effects of intense pressure upon metals at ordinary temperatures; and it would appear we may take the molecular (or crystalline) re-arrangement of metals, when flowing under pressure, to illustrate the readjustment of ice-crystals under corresponding conditions. This being so, we should

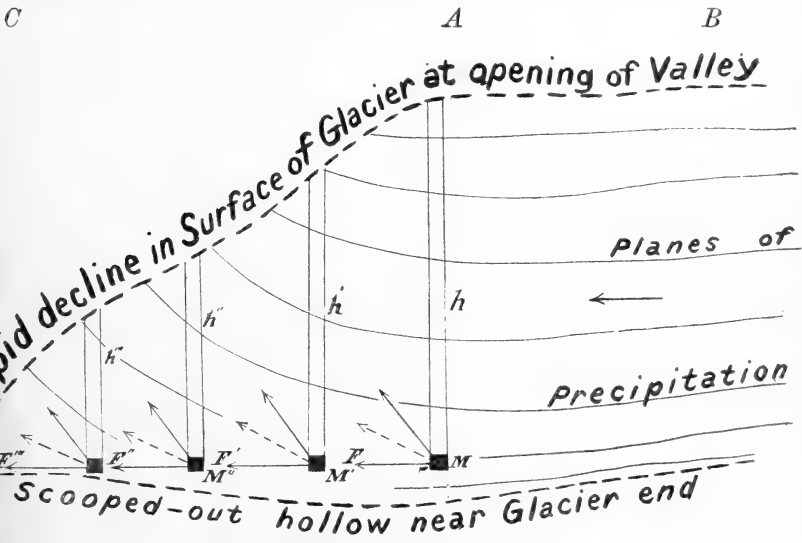


FIG. 1.

expect conditions such as the following in glacier-flow. Take AB (fig. 1) to represent an ice surface-plain, inclining slightly upwards towards B . AC another, rapidly declining towards C , where the opening from a valley admits of rapid expansion of the mass, and a corresponding rapid lowering of the surface. Let M be a very small ice-mass, a certain distance h below the surface, and let $h \phi M$ be a function of M expressing its tendency to spread under the pressure of the column of ice, h . Take M' and h' to represent, say, the adjoining mass and its depth: the corresponding function in this case is $h' \phi M'$. Thus $h \phi M - h' \phi M'$ represents a tendency in M to move (which is not counterbalanced by that of M') in addition to the general movement of

the mass. Part of the tendency thus expressed acts upward (as if the mass were a fluid) chiefly along the shortest line to the surface, as shown by thick arrows in the figure; and this compounded with the general onward movement of the mass, in a direction roughly indicated by the chain-line, must exercise a scooping action upon the ground beneath, which may account for the special deepening of valleys within their openings, as in the cases of the hollows now occupied by Lake Iseo and Lough Derg.

Dr. Hess, with other writers on Alpine glaciation, maintains that the V-shaped cross-sections of valleys are attributable, not to water erosion, but to the gouging action of successive glaciers, each producing a U-shaped valley. Four such stages of erosion have been noticed by Penck and Brückner,¹ and designated by them as follows:—

1. *Günz-Eiszeit*, because the fluvio-glacial deposits, the older boulder-clays from the glaciers of this period, are especially well developed on the Iller-Lichplatte in the district of Günz.

2. *Mindel-Eiszeit*, because the deposits of the period, corresponding to the later boulder-clay, are spread out chiefly in the province of Mindel.

3. *Riss-Eiszeit*, of which the deposits form terraces in the Riss valley on the north border of the Rhine.

4. *Würm-Eiszeit*, represented in the later terminal moraines and terraces in the region through which the *Würm* stream flows in the plains of Munich. They are briefly designated by the letters *G, M, R, W*; or *g, m, r, w*, for the deposits belonging to each system.

Hess² gives the accompanying section (fig. 1)³ to illustrate the formation of valleys according to this view, and writes as follows regarding them:—"In the Stubaital, in the Brenner-furche, in the district of the Zillertal Alps, and in the Ferwall, everywhere I found the profile of the valleys the same as in the figure (Venter Tal and Gurglar Tal); everywhere there are four trough-forms lying one within another; and the edges of the troughs, for individual valleys, retain courses almost parallel to the valley bottoms."

Comparing this view, and the section given, with a cross-section (fig. 2)³ of the gorge above Killaloe, there is a strong temptation to regard its features as due chiefly to three stages of glaciation.

¹ *Die Alpen im Eiszeitalter*, by Dr. A. Penck and Dr. E. Brückner. *Lieferung I.*, p. 110.

² *Op. cit.*, p. 364.

³ See Plate VI.

Without attempting so bold an assumption—for we lack anything that could be admitted as sound evidence—we need not have much hesitation in claiming that a glacier marking the latest stage of ice-action in our region did pass through the gap. It may have been of insignificant dimensions, as compared with Alpine giant glaciers, yet that which formed Lake Iseo seems to have been insignificant as compared to its predecessors.

Just as the glaciers deposited moraines at different stages of melting and recession in front of the Oglia Valley, so we find moraine mounds at four points in front of the Killaloe gorge:—some of an Esker type, south-east of Castleconnell; others at O'Brien's Bridge, representing, perhaps, a second stage of melting; a third at Birdhill, representing a third stage, and a mound at Killaloe, consisting chiefly of sand, and probably moraine, which deflected the course of the river slightly to the east.

We must not lose sight of the fact that, however well established the views Hess maintains would seem to be, there is a strong consensus of opinion against the great erosive power with which glaciers are credited, and in favour of river-erosion, even in the formation of the Alpine valleys. M. E. A. Martel brings together a formidable array of facts and authorities in support of his own judgment to this effect.¹ Thus he notes that MM. Fabre, Boule, Schardt, D. Martin, Mazauric, &c., have demonstrated that many of our present valleys existed prior to the Quaternary epoch. H. Schardt, writing of the geological structure of the neighbourhood of Montreux, says:—"The valleys have been dug out *before the glacial epoch.*" Warren Upham, too, writes upon *pre-glacial* erosion in the course of the Niagara gorge, and so forth. It would be out of place here to attempt even a moderate discussion of this interesting physico-geological question; but if we may venture to query the views of such eminent masters of glacial geology as Penck, Brückner, Hess, &c., we may ask whether, if the Venter-Tal, Gurgler-Tal, and other such valleys had existed in pre-glacial times, they might not have received their remarkable structure with parallel rims from ice-action, continued for considerable periods at different stages of glacier-decline? It seems unquestionable that many of the steep-sided gorges—some dry, others occupied by small lakes, as that near Wesen, on the Zurich-Chur railway-line—and ravines now being formed, owe their origin to waters rushing from melting glaciers, rather than directly to glaciers

¹ "Spelunca," tome vi., pp. 511 *et seq.*

themselves. It is also shown that sub-glacial rivers are very effective erosive agents; and M. J. Vallot, from observations beneath the Mont Blanc glaciers, denies the great erosive power attributed to the ice. Tourists may remember the wall or bank of solid strata which crosses the Rhone Valley between the *Dent du Midi* and the *Dent de Morele*, near St. Maurice; this, and a corresponding wall of limestone, across the Aar Valley, near Meiringen, are referred to by Brunhes and Martel, as considerable difficulties in the way of unquestioned acceptance of valley-formation by glaciers.

The facts above recorded impose upon us a measure of reserve in admitting all that we are asked to believe concerning the exclusive efficacy of glacier-erosion. While we have abundant proof that this agency has operated in Ireland, there are reasons for regarding the operations as limited, if not of comparatively small amount.

Of the fact that a glacier passed through the Killaloe gorge, and considerably affected the river-bed, there can, I think, be no doubt; the hollowing of the gorge and the moraines at its opening are sufficient evidence of it.

The question, however, presents itself: Why did ice, moving from the north, flow through the gorge, and not through the Scarriff and Nenagh valleys? No doubt, at an early stage of Irish glaciation, the overwhelming southerly ice-flow sent lobes through these valleys, where we now find drifts; but the Clare accumulation, which sent an ice-sheet across the Cratloe hills, as before mentioned—the latest of which we have indications of, in the form of striæ—would have blocked the way for an ice-flow by the Scarriff valley; and the ice descending from the Devil's Bit, and Keeper Hill range, and from Slieve Arra, would, similarly, have blocked the way along the Nenagh valley. The ice from the north, therefore, moving along the Shannon basin, and swelled by accessions from the neighbouring groups, forced itself through the gorge with great erosive power, especially where it worked its way around the corner of Slieve Arra towards the south, the deepest part of the present lake. The way in which the deepest part of Lake Iseo correspondingly hugs the prominence around which it turns westward has above been noted.

No geologist can contemplate the prodigious effects attributed by masters of this branch of the subject on the Continent to ice-action, without realising that in this agency exists a doughty rival to the combination of forces productive of sub-aërial denudation. Without insisting upon any special operations of glaciers in moulding, for example, the features already pointed out in Killaloe gorge, it seems

evident that we must take into account a considerable amount of glacial erosion throughout the country as a whole, in the lowering of the central plain to its present level. Evidences for a great thickness of ice are to be met with in many places, perhaps as great as 2,000 to 3,000 feet, if not more; and when we consider the work done, according to Hess, by glaciers of 300 or 500 metres in thickness, operating for 50,000 to 70,000 years, we might be tempted to dispense altogether with the agencies of sub-aërial denudation in carrying off 2,500 feet of solid strata from the surface of Ireland. The true estimate of time, probably, lies between 50,000 years—if thick ice could be supposed to have accomplished such work—and 30,000,000, or the still less estimate of 15,000,000 years, for reduction by sub-aërial forces alone.

The differential lowering of the surface, resulting in the present surface features, seems more consistent with the mild reduction due to sub-aërial waste than with the drastic mechanical force of an overwhelming moving ice-sheet. Thus, in the south of Ireland, the most soluble rock, limestone, invariably occupies the lowest ground; the calcareous Silurian slate, and fine grits, occupy the next level; and the coarse non-calcareous Old Red Sandstone and conglomerates form the highest ground—excluding the mid-Ireland granites of Dublin and Wicklow. The conditions are well exhibited in the Slieve-na-man, Galtymore, and Comeragh tracts.

Another circumstance may be mentioned which also tells strongly against the predominance of glacial over sub-aërial waste, including river-erosion, namely, the nature of the boulder-clays. They are, to a large extent, practically impervious to water; yet in the very region with which we are at present chiefly concerned—amongst the valleys of the Keeper Hill group—I noticed, some years ago, that while it was almost impossible to find, in some of those deposits, a scrap of limestone, small pieces of chert could be picked up in abundance. These indicate that the boulder-clays had been carried from off the limestone tract; but that being no longer, when found, surrounded by or attached to fragments of their original limestone matrix, the latter must have been completely dissolved away before the clay containing the cherts was picked up and borne along by the ice to be deposited where such are now to be seen. This would seem to have been the case with much of the boulder-clay of Ireland. Instances, however, frequently occur—for example, the very gravelly so-called boulder-clays—in which fragments of limestone are quite plentiful—constituting, in fact, a large percentage of the mass—and angular. In

such cases, intense crushing of the original rock mass is plainly suggested: crushing, that is to say, by a thick mantle of moving ice.

We may, therefore, infer from these considerations that, prior to the ice-period, the ground was probably honeycombed by streams, rivulets, and underground waters, particularly in limestone areas; that much clayey residue lay upon the surface after rock-solution by atmospheric moisture, gases, and rain—the results of sub-aërial waste throughout a prolonged period, possibly millions of years; and that ice-erosion operated upon rock strata affected as described, so that the features still indicate differential effects of sub-aërial waste, while the action of ice considerably diminished the total time apparently necessary for a general lowering of the island's surface.

CONCLUSION.

The various elements of this interesting subject, especially those not previously considered in detail, may be summarized as follows, viz. :—

1. A post-Eocene plain of denudation probably existed in this region, because the highest summits of the chief Irish mountain groups lie upon an ideal plane, though formed of different kinds of rock, and belong to five different formations and masses, including granite of, possibly, Miocene age.

2. This plain was some 2500 feet above present limestone plain, and was that upon which the Shannon originally commenced to flow.

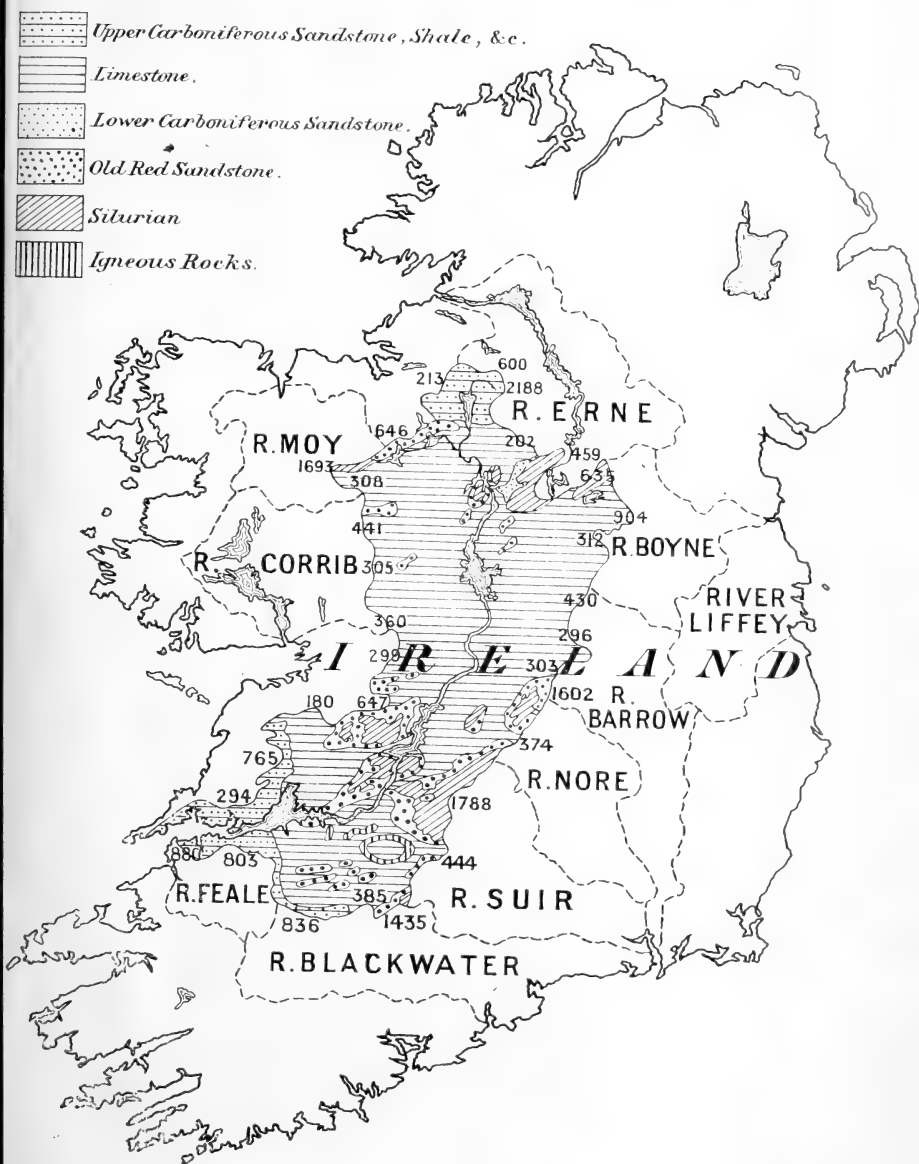
3. At the present rate of surface-waste, differential lowering may have occupied 15,000,000 to 30,000,000 years.

4. This period may have been greatly curtailed by glacial erosion of the surface.

5. The gouging action of a glacier accounts—apparently alone can account—for the present form of the Shannon-bed above Killaloe.

6. Prior to the Glacial Period, the river was probably forced to abandon the Killaloe gorge for a time, and flowed along the Scarriff valley towards its estuary.

7. Upon the melting of the glacier the bottom of the gorge had become so modified that the river could resume its course there, and southward as far as O'Briensbridge, though thereafter it became deflected by moraine accumulations from its original course.



KILROE—The River Shannon.



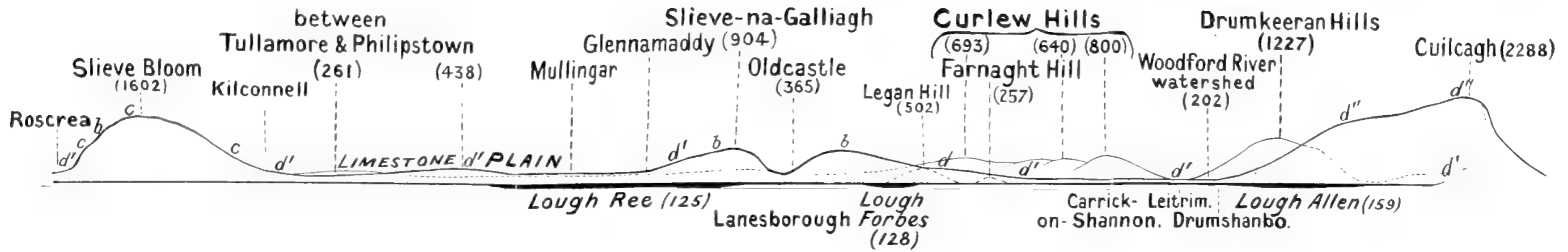


FIG. 1.

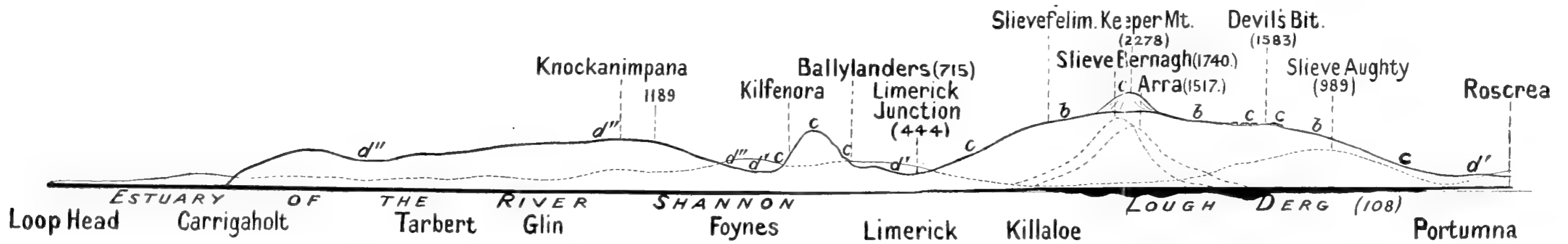


FIG. 2.

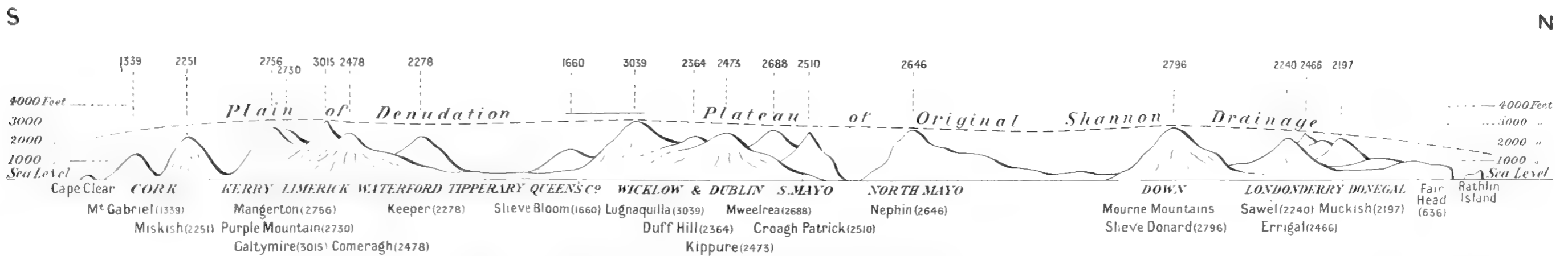
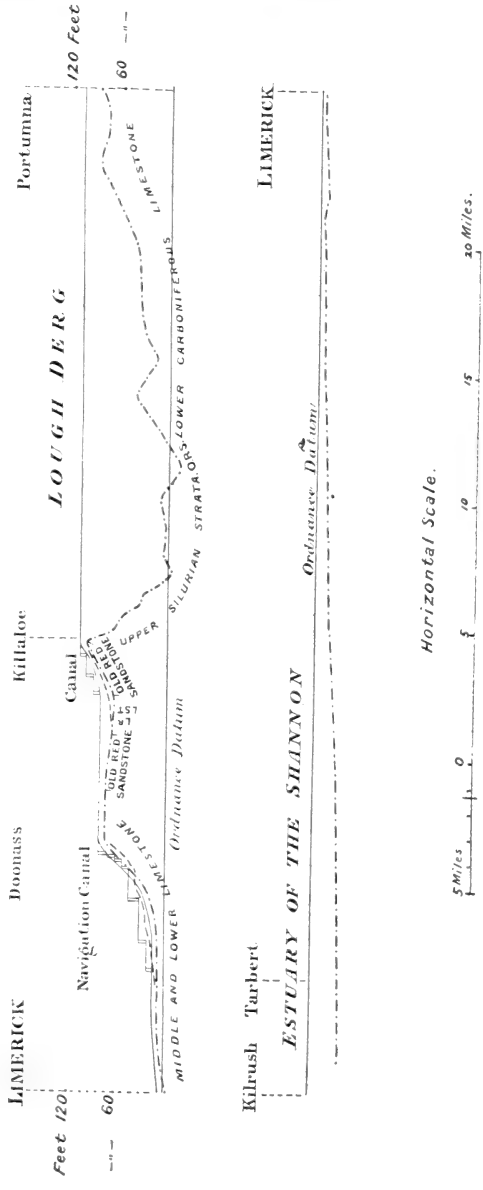


FIG. 3.



KILROE--THE RIVER SHANNON.



Ä Schwarze Schneide
3267 m.

Neder Kogl
3166 m.

Scherner Spitze
3116 m.

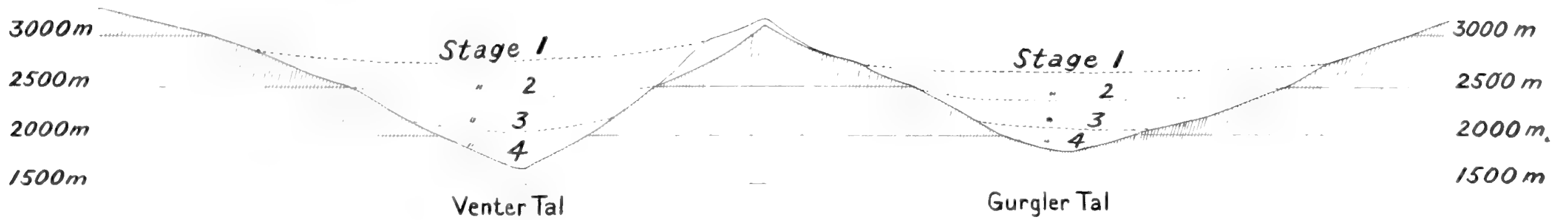


FIG. 1.

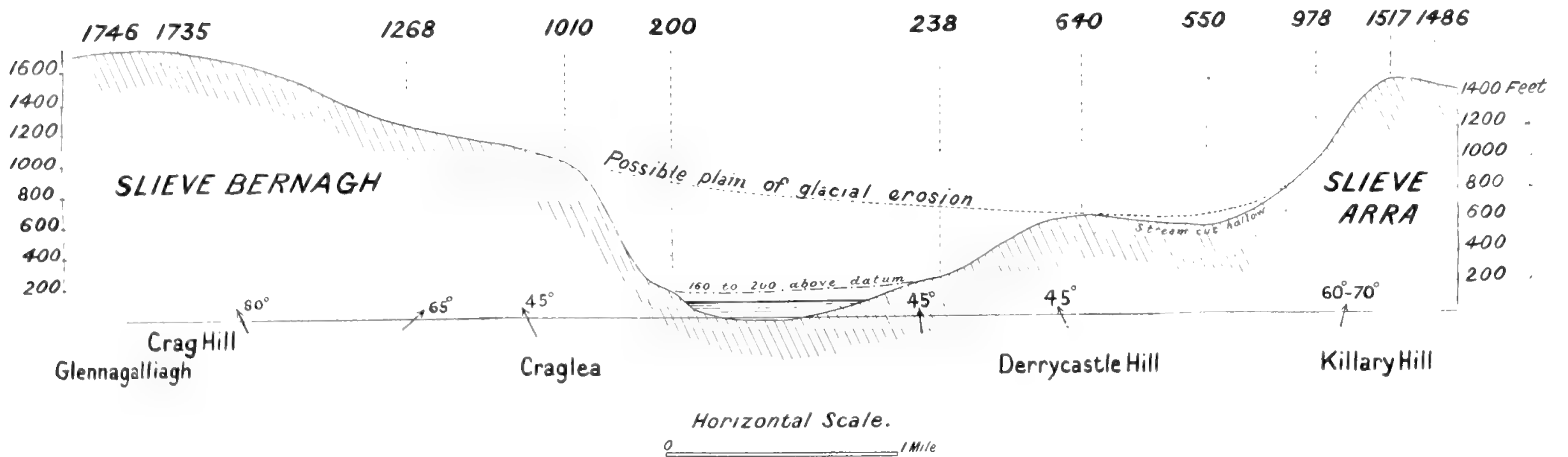


FIG. 2.



IX.

THE LOWER PALÆOZOIC ROCKS OF POMEROY.

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PLATES VII., VIII.

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ATTRACTED by the magnificent fossils of this remote district, and realizing that there was some divergence of opinion as to the age of the beds containing them, some Cambridge geologists in 1905 agreed to attempt the working out of the structure of the area, and the correlation of the beds there represented.

The field-party consisted of the present authors, together with Miss I. L. Slater, of Newnham College, and Mr. A. McDougall, of Christ's College; and its work was done during the pleasant and unusually dry summer season of June and July, 1905. We desire to express our gratitude to Prof. G. A. J. Cole, for his kindness in facilitating our work in every way.

During the field-work, Miss Elles, as palæontologist, made approximate determinations of the all-important Graptolites, while Mr. Fearnshides plotted localities, sections, and structural details upon the six-inch map. In the collecting all took an equal share. The material so obtained was taken to Cambridge, and has since been worked over by the authors of the present communication. The Graptolites have been studied by Miss Elles; the Trilobites and other fossils have been, as far as possible, identified by Mr. Smith, who is also responsible for the drawing and reduction of the field-map to its present form. All notes, tables, &c., so prepared were then given

over to Mr. Fearnside, who, from this and all other available information, together with his field-notes, has written the present paper.

The Pomeroy district of Central Tyrone lies on the south-east border of the Derry and Donegal Highlands, and adjoins the lowest pass between the waters of the Bann and the Foyle, Blackwater, or Shrule, over which the railway from Portadown to Omagh passes.

As a district of geological interest, the Pomeroy or Desertcreat district, as it was then called, was first recognized by Patrick Doran and other official collectors sent out during the Ordnance Survey of 1838, and as a district of known Silurian rocks remains uncoloured on Griffith's geological map of Ireland of 1839. In 1845 Desertcreat was made known to geologists by the publication of Portlock's "Geology of the County of Londonderry, and parts of Tyrone and Fermanagh." In that great work, Portlock shows that, from his examination of the fossils, he is able to identify the Caradoc sandstone division of Murchison's "Silurian System," and appends an accurate monograph and description of some 216 species of fossils obtained therefrom.

The Report also includes a description of the lithology of the rocks discussed, and a map upon which all available localities are carefully plotted.

For the purposes of the new one-inch Geological Survey map, the district was re-mapped by Joseph Nolan in 1877, and the sheet memoir published in 1878; the dips and exposures of strata indicated by Portlock were more accurately replotted on this map, and the memoir contains a comprehensive list of the fossils of the district, compiled by W. H. Bailey.

The Graptolites originally described by Portlock are referred to in several papers on Irish Graptolites by Lapworth;¹ but although this author then pointed out that those Graptolites cannot belong to Bala or Caradocian rocks, it was not until the appearance in 1895 of the brief note in Watts and McHenry's "Catalogue of the Rocks and Fossils in the collection of the Geological Survey of Ireland," which refers them to the Llandoverly or Tarannon, that they came to be regarded as belonging to a series other than that which contains the Desertcreat Trilobites.

In 1885 Marr and Roberts, for the purposes of the identification of

¹ Proc. Belfast Nat. Field Club, 1877, Appendix. Ann. Mag. Nat. Hist. (5), vol. iii., 1879-1880.

their Haverfordwest fossils, made a re-examination of Portlock's type specimens, and, in so doing, were able to refer the Trilobites of the district to the upper division of their Bala rocks, and thereby to correlate Portlock's Caradoc sandstone with what has now become the Ashgillian series.

In 1896 the officers of the Irish Geological Survey returned to the area, and, as represented by McHenry and Egan, collected such considerable suites of fossils that the Survey palæontologists were able definitely to identify several zones of Birkhill or Llandoverly rocks, as well as to confirm the Ashgillian age of the great bulk of the Trilobite-bearing sandy beds. The fossils collected at this time are now preserved in the collections of the Irish Survey; but the results of these researches have not been published.

The actual Lower Palæozoic area is more or less triangular in shape, with sides varying between three and four miles in length. The base faces to the north, and is rather irregular. Along it the lowest members of the fossiliferous series adjoin a very variable mass of ancient hornblendic or granitic rocks, while along the southern, south-eastern, and south-western sides, the various members of the series are unconformably overlain by the characteristic green and red sandstones and conglomerates of the local Old Red Sandstone.

Unfortunately the district is much drift-covered; and its scenery is dependent upon the irregular distribution and variable character of its esker-like mounds of drift. These consist of porous semi-stratified sands and gravels; and only where the usually over-full streams have deepened their valleys down to the solid rock below are the interesting lower Palæozoic rocks exposed. No large amount of stiff boulder-clay or till was met with; but the gravel contains many travelled boulders of large size which, if of sedimentary origin, often contain good fossils.

These gravel-ridges are] occasionally from 100 to 150 feet high, and in places are so steep-sided that they fail to support more than a very scanty covering of vegetation. Under these conditions, all evidence as to structure or succession of the rock-series must be based upon scattered exposures, or upon palæontology, and a detailed comparison of the faunas of the various rock-beds with those observed in other and more openly exposed districts. The exposed areas and the detailed succession afforded by each are indicated upon the map, and in the absence of a sufficiency of place-names will only be alluded to incidentally in the body of the paper.

The following sub-divisions of the sedimentary series have been

found most useful by the authors of the present paper. They are founded essentially upon palæontological evidence, but, after a little experience, are readily recognizable on purely lithological grounds, and by this means are traceable unchanged through all available exposures.

Corrycroar Group = Tarannon.

Undivided.

Little River Group = Llandoverly.

Lime Hill beds.

Slate Quarry beds.

Mullaghabuoyah beds.

Crocknagargan beds.

Edenvale beds.

Desertcreat Group = Ashgillian.

Upper Tirnaskea beds.

Killey Bridge beds.

Lower Tirnaskea beds.

Bardahessiagh beds.

These local names are taken directly from the six-inch Ordnance map of 1856, and are here introduced only for the purpose of reference, and for the avoidance of circumlocution in description.

We may now consider these various sub-divisions in order, beginning with the oldest, and, in so doing, will leave all questions of structure and correlation of the beds to a later stage.

The Bardahessiagh Beds.

As indicated in the table, the Bardahessiagh beds form the basal member of the Palæozoic series. They occur all along the northern edge of the district, where they adjoin the hornblendic and granitic series of the Ulster Highlands, and are brought up again by a sharp fold in the neighbourhood of Killey Bridge. According to the view of the present authors, they must rest with notable discordance and unconformity upon the Highland metamorphic rocks; but the actual base of the series has never been very well seen, and is not now exposed. The lowest members of the Bardahessiagh beds now observable are the rocks exposed along the Slate Quarry road, just south of Craig Bardahessiagh, and are the coarsest of the series. They consist of almost unweathered felspars and micas, with abundant angular quartz chips, which are embedded in a sort of serpentinous paste such as might well be directly derived from the denudation of the hornblendic series, or of the mica schist country a little further north. Conglomeratic beds—such as are mentioned by Portlock—are now

only visible in walls and stone heaps along the line which we have taken as our northern boundary, and, though not now exposed, would seem to belong to the series under review. The general mass of the Bardahessiagh beds consists of coarse to fine grained grits, with well bedded calcareous flagstones at the top, and is notably micaceous throughout. The lower members are always loosely consolidated, but the higher ones, being well provided with Brachiopods and other fossils, are rendered more compact by a calcareous cement. We were informed that at one time they were much quarried for building purposes, and also for the manufacture of flags, hearthstones, and even grindstones. In general the series is thick-bedded, but, among the flaggy beds at the top, quite finely laminated micaceous shales are often interstratified.

The flagstone quarries are now closed and overgrown; the richly fossiliferous collecting grounds which they provided to the early collectors are therefore most unfortunately no longer available. Walls, however, and heaps of stone remain; and along the high ground flanking the southern slopes of Craig Bardahessiagh the process of agriculture frequently brings to light richly fossiliferous blocks which, if not prolific enough to enable us to add to the long lists of Portlock's collections, are more than sufficient to identify the horizon.

The commonest fossils in the lower unconsolidated sandy beds are rude casts of an *Orthis* like *O. calligramma*. Higher up the large *Strophomena grandis* appears in surprising abundance, and makes up a very considerable proportion of the rock-forming material. It is associated with *Strophomena siluriana*, a true Ashgillian form, and in the softer beds which are interbedded with it, *Illænus*, *Bellerophon*, and various ill-preserved Gastropods are present in some abundance. In the most calcareous beds, which are practically limestones, a Harpes and some pieces of the huge *Lichas hibernicus* and glabella of *Staurocephalus* were occasionally observed.

Under the microscope, various examples of the gritty and flaggy beds show an unusual amount of fresh felspar, both orthoclase and andesine; with this is also a good deal of partly chloritized mica, a serpentinous paste, and numerous detached grains of epidotic or hornblende minerals, giving high colours between crossed nicols. A crushed specimen of a less consolidated grit, when separated by means of a heavy liquid (s.g. = 2.7), yielded abundant and rather large tourmaline needles along with rounded red garnets, staurolite, epidote, and leucoxene. When weathered, the characteristic light-blue or grey colour of both flags and grits gives place to a rather dull gingerbread brown, which, at first affecting only the surface of the

rock, soon forms a sort of ever-thickening porous crust, which gradually encroaches upon the sharply defined hard kernel of blue unweathered rock. Concretionary structures are not common in the Bardahessiagh beds; but the so-called worm-tracks and worm-casts, which affect so many of the flaggy bedding planes, are probably due to some obscure form of concretionary action.

The Killey Bridge Beds.

By the further diminution in the proportion of coarse material, the Bardahessiagh beds pass up into the Killey Bridge beds. Like the older series, the Killey Bridge beds are thought to occupy a belt of country more or less parallel to the boundary of the metamorphic rocks along the southern flanks of Craig Bardahessiagh; but, unlike them, they are known to outcrop at many widely separated points within the watershed of the main Pomeroy river; and as we know them to be the thickest of the sedimentary divisions, it may well be that, beneath the drift, they occupy the greater proportion of the Lower Palæozoic Pomeroy inlier. The best exposures are—(1) the fine section which adjoins the overlap of the Old Red Sandstone in the Little River just south of the Slate Quarry; (2) the unnamed brook-section between the Pomeroy-Bardahessiagh road and the Slate Quarry; (3) the road-side exposures south of the railway at Killey Bridge; but characteristic Trinuclei may be obtained at many other localities, and from almost any of the banks where boulder-bearing drift can be observed.

As we have said, the basal members of the Killey Bridge beds are practically inseparable from the Bardahessiagh beds below. Higher beds, however, are much finer and softer than any, except shaley partings among the flags of the lower group; and the Killey Bridge beds, as a whole, are best described as a series of calcareous or ferruginous mudstones. They, too, weather with a thick, porous, almost velvety crust, and, like the highest Bardahessiagh beds, are very fossiliferous. The lowest beds, as seen near Killey Bridge, or in the brook south of Bardahessiagh, have alternations of coarser materials like the flags below; but upwards the bedding planes become much less evident; and the greasy character of the serpentinous paste of the older beds remains to indicate the close relationship between the two. The lowest partly flaggy beds abound in innumerable fragments of Lamellibranchs, Gastropods, Crinoids, and Cystids. With these, also, occur *Phacops Brongniarti* and a Calymene; but, at the time of our visit, these beds were not well exposed.

The next division, however, was better seen, especially in an up-standing cliff partly undercut by the Little River, just south of the Slate Quarry, and, together with various varieties of *Trinucleus concentricus*, yielded abundant examples of *Ampyx rostratus*. These beds when weathered take on a bright ochreous yellow or brown colour, and break up characteristically into little lenticular flakes or chips of shivery shale before they pass into the final dark brown marly clay of the soil above. In many respects this division is exceedingly like the Dindymene shale of Austwick, Yorkshire, and certain beds among the Slade series of Wales.

Upward, these ochreous mudstones, with their swarms of *Trinucleus* and *Ampyx*, pass into the sombre leaden grey micaceous mudstones, which on the north side of the Little River, east of the Slate Quarry, have yielded a few examples of *Remopleurides*, with fragments of other Trilobites and a few Lamellibranchs. Whether *Remopleurides* invariably occurs at a higher horizon than *Trinucleus* we could not decide, for our only exposure with *Remopleurides in situ* occurred in the immediate neighbourhood of a large structural fault; and hence Phacops beds and *Trinucleus* beds, with leaden shales and a probably higher flaggy bed containing *Diplograpti*, are here grouped together as Killey Bridge beds. In the higher part of the leaden shales the bedding planes become quite prominent; and gradually the mudstones pass up into flags. Here the flaggy beds, as seen at the bottom of the old Slate Quarry mill-sluice, are distinguished from the basal Killey Bridge beds only by the absence of mica. With the incoming flaggy conditions, Lamellibranchs, Gastropods, Cystids, and Crinoids seem completely to oust the Trinuclei, while Harpes and a *Lichas* again become conspicuous, and with them a few fragments of *Diplograptus truncatus* can usually be found.

With the exception of a single Graptolite-bearing exposure at Lime Hill, the top of the Killey Bridge beds seems to represent the highest fossil-bearing horizon which was known to Portlock; and hence, considering the date, his estimate that the rocks belong to Caradoc Sandstone must be regarded as a very wonderfully close approximation to the truth.

The Lower Tirnaskea Beds.

The Tirnaskea beds form the highest member of the Ordovician System, and are exceedingly interesting in that they contain both Graptolites and Trilobites. They have been observed only in two

-exposures in tributary streams which join the Little River in the neighbourhood of the Slate Quarry; and in neither of them is the actual passage upward or downward very clearly shown.

The Lower Tirnaskea beds seem to be a direct continuation of the highest flaggy member of the Killey Bridge beds; but the little anticlines which cause them to be exposed in the Tirnaskea stream are only sufficiently dissected to allow a very little of these to be seen; while in the brook south of Bardahessiagh this portion of the section is completely covered by rain-wash and drift. The lowest Tirnaskea beds of the Tirnaskea stream are more gritty than any of the Killey Bridge beds, and from the fact that they occur in beds with good cuboidal jointing, often about a foot thick, they are readily recognizable. They are always tough and very 'blocky,' and though they probably contain many fossils, these fossils are extremely difficult to extract. The cementing material is some rhombohedral carbonate, which is far from brittle, and the rock, whether weathered or fresh, seems always to crush, rather than to break, under the hammer.

Under the microscope, the rock is remarkable for the large proportion of perfectly fresh oligoclase and andesine which it contains. Its quartz grains, like those of the Bardahessiagh beds, are sharp and angular, while, unlike the beds of the lower series, the mica, if present, is only in the pasty ground-mass. A few grains of tolerably fresh hornblende and a little brightly polarizing epidote are also present among the well-sutured grains of the calcareous cementing ground-mass. The well-known Ashgillian Trilobite *Phacops mucronatus* is represented by five large specimens with well-developed eyes; and a few specimens of the Hartfell Graptolites *Dicellograptus complanatus* var., with *Diplograptus truncatus*, were obtained in certain of the lenticular streaks of shale occurring within the massive grit.

The Upper Tirnaskea Beds.

There is a very sudden transition from the Lower Tirnaskea grits to the smooth-banded mudstones and shales of the Upper Tirnaskea beds. These are only exposed for a very few feet, but the highest zone fossil of the Hartfell Shales, *Dicellograptus anceps*, was found in the laminæ of black or purple shale which form partings in the green or grey mudstones at intervals of an inch or two. With it also occurs *Æglina rediviva*, that much-discussed recurrent Trilobite of Barrande's Bohemian "colonies," which is here recognized for the first time in Ireland.

These Tirnaskea beds occupy the central part of a denuded syncline in the Tirnaskea Stream, and have not yet been found in immediate association with the overlying Llandovery, or Little River group; but from the fact that the lowest beds of these closely resemble the highest unfossiliferous member of the Tirnaskea beds, both being, moreover, of graptolitic and presumably slowly deposited type of sediment, we are of opinion that the gap between them is of small importance, and that the succession is continuous. The further evidence that in the beck, south of Bardahessiagh, the grits, with *Phacops mucronatus*, come within ten feet of an exposure of shales, with Llandovery Climacograpti in an undisturbed, though ill-exposed, section, is suggestive, and tends to the same conclusion.

The Crocknagargan Beds.

To the lowest of the Llandovery (Little River group) sediments we have given the name Crocknagargan beds. These are a thin series of greenish-grey pyritous shales, containing few fossils, but in which a few Graptolites were obtained at a locality about 100 yards east of the Pomeroy-Bardahessiagh road bridge over the Little River, and on the south bank of the stream. The species identified include *Cephalograptus acuminatus* and *Climacograptus normalis*, and though no clear section either upward or downward can be made out, both lithology and palæontological evidence enable us to recognize close similarities between this and the *Cephalograptus acuminatus* zone at Moffat. The smooth character of the mudstone, and a certain purple streakiness seen only when freshly broken rock is moistened, indicate lithological affinities to the Upper Tirnaskea beds (*Dicellograptus anceps* zone) below, while the close approximation of the micaceous shales of the *Diplograptus modestus* beds above, both at this and at the locality of Crocknagargan itself, indicate a continuous passage to the beds above. The Crocknagargan stream (south of Craig Bardahessiagh) probably affords the best section of these beds, but was not workable at the time of our visit. There the 10 to 15 feet of greenish beds which intervene between the hard grits with *Phacops mucronatus* and the equally resistant micaceous beds with *Diplograptus modestus* enable us to infer that the total thickness of the Crocknagargan beds is not more than 10 to 12 feet.

The Slate Quarry Beds.

The Slate Quarry beds are much more satisfactory, and are well exposed in several places along the Little River, especially in its

largest tributary, the Slate Quarry stream. They also appear again in the bed of one of the tributaries of Corrycroar river, in the extreme south of the Pomeroy inlier, where they are directly overlain by the conglomerates of the Old Red Sandstone. The lowest beds of the series include a few bands of smooth grey shales, not unlike the fossiliferous Crocknagargan beds; but the greater part of the Slate Quarry beds consist of soft, easily bruised blue-grey micaceous flagstones, with a texture rather like cardboard and splitting with difficulty. Fossils, when found, are in general fairly well preserved, and in low relief; but they are not abundant. Some of the beds contain a good deal of rather coarsely distributed pyrites, and, in the early stages of weathering, become coated with a thick rust, but in later stage are more or less completely bleached. This bleaching is particularly prone to occur in places which have been long exposed to chemical weathering—as, for example, near faults and in upstanding cliffs. A curious lemon-yellow stain on the surfaces is also characteristic of certain of the members of this series. *Diplograptus modestus* is the commonest and most widely distributed fossil, but *Diplograptus vesiculosus* is also found in certain of the finer-grained beds, especially in the southern exposures, and with these are associated the usual Climacograpti, *Cl. normalis*, and *Cl. medius*, &c.; the whole assemblage is strongly reminiscent of the fauna described by Herbert Lapworth from the Lower Dyffryn, or modestus-Flags of Wales. The Slate Quarry beds are always recognizable by the large proportion of micaceous material they contain, and, like the members of Desertcreat group, seem to have been formed by the denudation of some ancient series of crystalline schists. Though not the hardest, they seem to resist denudation more than any other member of the Little River group, and, where exposed, almost always confine the streams to quite narrow gorges.

The Edenvale Beds.

The Edenvale beds follow directly upon the Slate Quarry beds, and in their exposures along the Little River, the Edenvale mill-sludge, and the Slate Quarry stream, occur as narrow synclines folded in among the broader anticlines. Their lowest bed is very characteristic; it shows a marked tendency to break into cuboidal blocks, and is a hard, dark, fine-grained, and very calcareous rock, and, unlike even the highest member of the Slate Quarry beds, contains but a very small proportion of mica. *Dimorphograptus* is its characteristic Graptolite genus: we

may therefore term it the *Dimorphograptus* band; and from the fact that almost all the other species of *Graptolites* it contains range upward rather than downward, we have here decided to group it with those higher beds as the lowest member of the Edenvale beds. It is about three feet thick, and to us has proved most prolific at its most southerly exposure in the Slate Quarry stream, immediately opposite the road entrance to Edenvale House. The most usual fossils are *Dimorphograptus confertus*, *D. longissimus*, and *Monograptus tenuis*.

The rest of the Edenvale beds possess equally distinctive lithological characters, and are the most readily traceable of all the members of the Little River group. They are a series of dark to light grey shales, mainly unfossiliferous, but with numerous conspicuous darker partings, streaks, and thin bands of *Graptolite* shale, yielding *Climacograpti* and various narrow forms of *Monograptus*. They contain much finely divided pyrites, and, unlike the Slate Quarry beds below, are always covered with an ochreous rust or slime during the early stages of weathering, and disintegrating rapidly, pass to a dark ochreous clay paste before they bleach. The total thickness of this division may be about 15 to 20 feet. The most obvious of the *Graptolite* species are *Monograptus tenuis*, *M. cyphus*, and *Climacograptus rectangularis*.

The Mullaghabuoyah Beds.

The Mullaghabuoyah beds are also well exposed, and are repeated by folding again and again along the bed and banks of the Little River, above the Slate Quarry, and in its northward-flowing tributary, within the Pomeroy demesne. They too, are a series of banded mudstones, and, with the belt of grey flaggy shales in their midst, are probably the thickest of the divisions within the Little River group. A close study of them would probably lead to the adoption of a three-fold division of the series into a lower member, whose lithology is not unlike the upper beds of the Edenvale beds below; a middle member, unfossiliferous on the whole, consisting of papery shales and thin bedded fissile, gritty flags; and an upper banded series of blue, almost black, shale. Owing, however, to the difficulty of indicating the excessive folding noticeable at each of the available exposures, such separation has not been attempted upon the map.

The lowest mudstones, with blacker shale bands, contain a fauna which, except for the presence of *Monograptus triangulatus*, is

practically identical with that of the Edenvale beds; but with the gradual diminution of the proportion of these dark bands, we pass to the middle division: *M. triangulatus* becomes a conspicuous fossil, and *Climacograptus Törnquisti* gradually replaces the *Cl. rectangularis* of the lower beds. The grey, flaggy beds maintain the same characteristics; but the fossils are more sparsely distributed. Some, however, of their paler grey bands now contain fossils, and are particularly characterized by the abundance of *Monograptus acinaces* with *M. triangulatus*. In this series, also, near the head of the Edenvale mill-sludge, there occur a few unusually fine examples of *Rastrites peregrinus*. Another feature of the grey papery flags of this horizon is the development of a sort of peppery sprinkling of small granular concretions of pyrites. These range from about .2 mm. to 2 mm. in diameter, and have a radial fibrous structure. Their occurrence in an otherwise non-pyritous rock is curious, but is not uncommon in other contemporaneous deposits, such as the Gigrin mudstones of Rhayader, the Skelgill shales of the Lake District, and the Rastrites beds of Sweden. The upper blue-grey to black banded beds again yield many Graptolites, *Monograptus triangulatus* being particularly abundant. A few Petalograpti were also observed with *Climacograptus Törnquisti* in the less prolific beds; and though the present authors are not able to recommend the application of the three Lake District subdivisions of the *M. gregarius* zone of South Scotland to the Mullaghnabuoyah beds, the existence of these three sub-zones is distinctly indicated. The thickness of the Mullaghnabuoyah beds is not easy to estimate; but the middle flaggy division cannot be much less than 50 feet in thickness, while the rest may vary between 20 and 30 feet. The upper division, as seen at Mullaghnabuoyah, passes almost imperceptibly into the Petalograptus band of the succeeding Lime Hill beds.

The Lime Hill Beds.

The Lime Hill beds are so called from the one Graptolite locality known to Portlock, whence he obtained his *Graptolithus Sedgwickii*. This locality is far distant from all those hitherto alluded to, but can fortunately be correlated with them, since the lowest bed seen in the Lime Hill section appears to occur also in the centre of a much compressed syncline at Mullaghnabuoyah. This lowest bed is quite like the topmost beds of the Mullaghnabuoyah series, but is even darker, and is a banded mudstone rather than a shale; seen at Mullaghnabuoyah, it is blue-black, and perhaps three feet thick, and is

characterized by the presence of *M. Sedgwickii* var. *distans* and by numerous Petalograpti. The thin *tenuis*-like *Monograptus discretus* is also seen, but is not so abundant at Mullaghnabuoyah as at the Lime Hill exposure. At Lime Hill, the lowest bed exposed is again a blue-black mudstone, but is only faintly banded. A foot or two higher this gives place to a somewhat calcareous dark-coloured rock, which contains well-preserved examples of the various Petalograpti, with what appear to be fragments of Lamellibranchs. These, with interbedded softer black mudstones, continue for some six feet; but their higher bands contain no obvious Petalograpti, and, becoming suddenly paler upward, pass into rocks similar in texture to the harder beds discussed, but of variegated green and yellow colours. A break in the section possibly cuts out a foot or two of rock; the next rock seen has regained its intense black colour, and appears as a black micaceous mudstone with sooty black shale partings. These highest somewhat micaceous beds appear to be the *Graptolithus Sedgwickii* horizon of Portlock, and their calcareous beds also yielded him certain Lamellibranchs. They also contain well-preserved examples of *M. involutus*, *M. discretus*, and many obscure fragments of *Orthis* and other Brachiopods. The total thickness exposed at Lime Hill is something less than 20 feet; and owing to the superabundance of drift, no passage to the next higher Corrycroar or Tarannon group can be seen. The occurrence of the pale green and yellow bands among these Sedgwickii beds is exactly paralleled by the similar occurrence at the same horizon at Dobbs Linn and Lockerbie, in the Moffat district of South Scotland, and by the variation in colour shown by the Sedgwickii beds of Skelgill.

The Corrycroar Group.

Of this, the highest Silurian series exposed within the Pomeroy area, little could be ascertained during the time at our disposal. The only exposure we could find is in the gorge of the Corrycroar stream, where, along the river bed, beautifully even-bedded flags of the Gala type are laid bare for nearly half a mile. Unfortunately, notwithstanding their beautiful lamination, it proved impossible to obtain fossils from these beds; and, as a result of two days' work, only two fragmentary Graptolites with cells of the type of *M. vomerinus* were discovered. The rocks are green, flaggy, and very monotonous; they are hard, somewhat brittle, and very well jointed, and, indeed, are very like the fine-grained members of the Gala grit series of South Scotland, but, in the 100 or 150 feet exposed, include no beds coarse

enough to be termed grits. They are very evenly bedded; and in the Corrycroar section, where they adjoin the Old Red Sandstone, have escaped or resisted folding to a remarkable extent. In other localities, the Corrycroar beds were only observed in the drift. Boulders probably referable to them, and not far travelled, are abundant in the Lime Hill district adjoining the exposure yielding *M. Sedgwickii*, and have the good chocolate-red and green colour so often found in rocks of the age of the Tarannon shale. Some of the blocks at this locality show darker, almost black, bandings among the red; and these contain undeterminable fragments of *Monograpti*. These beds are smoother and more like a mudstone than the flags of the Corrycroar section, and hence there possibly exists a lower division of red Corrycroar mudstones continuous with the black mudstones of the Lime Hill beds; but in the absence of further evidence, we can only affirm the probable extension of a Gala type of Tarannon sediment over the whole Pomeroy region.

Summary of Succession.

The Lower Palæozoic rocks of Pomeroy may be tabulated as follows:—

CORRYCROAR GROUP (= Tarannon).

Green and purple mudstones, shales, flags, and grits of Gala type, unfossiliferous and undivided.

LITTLE RIVER GROUP (= Llandovery).

Dark or blue graptolitic shales of Birkhill type with some grey flags.

Zone of *Monograptus Sedgwickii* = Lime Hill beds.

- (8) Black shales with calcareous bands. *M. Sedgwickii*. *M. discretus*. *M. involutus*. *Cl. scalaris*.
- (7) Black mudstones ("Petalograptus band"). *M. Sedgwickii* and var. *distans*. *M. jaculum*. *M. discretus*, and *Petalograpti*, &c.

Zone of *Monograptus triangulatus* = MullaghnaBuoyah beds.

- (6A) Dark shales and mudstones. *M. triangulatus* abundant.
- (6) Grey shaly flags with pyritous spots. *M. gregarius*. *M. acinaces*. *M. triangulatus*, &c.
- (5) Blue grey shales with black bands. *M. triangulatus*. *Rastrites peregrinus*. *Cl. Törnquisti*, and *Cl. Hughesii*.

Zone of *Monograptus tenuis* = Edenvale beds.

- (4) Smooth blue-grey shales with black bands. *M. tenuis*.
M. cyphus. *Cl. rectangularis*.
- (3) Black "blocky" mudstone (Dimorphograptus band).
Dimorphograptus confertus. *D. longissimus*. *M. tenuis*, &c.

Zone of *Diplograptus modestus* = Slate Quarry beds.

- (2) Micaceous grits and flags. *Diplograptus vesiculosus*. *D. modestus*. *Cl. normalis*. *Cl. medius*, &c.

Zone of *Cephalograptus acuminatus* = Crocknagargan beds.

- (1) Micaceous flagstones and shales. *Cephalograptus acuminatus*.
Cl. normalis, &c.

DESERTCREAT GROUP (= Ashgillian).

Calcareous micaceous mudstones, flags, and grits of Girvan or shelly type, with some graptolitic shales towards the top.

Tirnaskea Beds.

- (5) Smooth banded mudstones. *Aglina rediviva*, and *Dicellograptus anceps*.
- (4) Tough blocky calcareous grits. *Phacops mucronatus*, and
Dicellograptus complanatus. *Diplograptus truncatus*.

Killey Bridge Beds.

- (3) Soft calcareous blue or grey chloritic mudstones, thick, and containing a very rich fauna.
- (d) *Remopleurides Colbii*, and *R. dorsispinifer*.
- (c) *Trinucleus seticornis*, and *T. Portlockii*. *Ampyx rostratus*.
- (b) *Phacops Brongniarti*.
- (a) *Calymene Blumenbachii*, var.

Bardahessiagh Beds.

- (2) Hard and calcareous flags and fine grits. *Strophomena grandis* and *S. siluriana*. *Lichas hibernicus*, and *Harpes Dorani*.
- (1) Unconsolidated sands and conglomerates, *Orthis* and *Strophomena*, spp.

The Old Red Sandstone.

The Old Red Sandstone or "Dingle beds" of the Pomeroy district were not examined in any detail; but during the attempt to discover the boundary of the Lower Palæozoic rocks, sufficient was seen to render it evident that the two series are separated by a strong unconformity, and that the Dingle beds overlap the Silurian on to the ancient hornblendic rocks. The basal Dingle beds do not follow the line of the colour-change marked upon the old one-inch Survey map of 1877, but instead come on at the various exposures indicated upon that map as conglomeratic Bala beds; and accordingly the failure of later visitors to the district to find evidence of unconformity along the line mapped is not to be wondered at. The basal Dingle beds of our mapping are usually massive or flaggy sandstones; but they include many beds of coarse, rubbly grits, and conglomerate or other resistant rocks, and contain many pebbles of quartz. Among these pebbles we were struck by the abundance of subangular or even angular cherts and lydian stones, such as might come from the Arenig or Llandeilo cherts of South Scotland. We also noticed several decomposed fragments of a hornblende granite, which we think may be the Bardahessiagh rock, and with it many more or less decayed pieces of Ordovician and Silurian sediments with obscure fossils.

The basement beds of conglomerate were never seen; and no section giving a full view of the unconformity could be found. The boundary of the series as indicated upon the map is really a line drawn to pass between certain localities; and if the smooth-flowing outlines indicated are a trifle artificial, we can only say that they are not claimed as more than a diagrammatic representation of the truth. The dip of the Dingle beds is less constant in direction than that of the Lower Palæozoic rocks; but it does not differ greatly from the latter in magnitude; and it would seem that, though less yielding in their behaviour, the Dingle beds have been involved in nearly all the earth-movements which have contorted the lower series. Since, however, about Slievebane, the red and green sandstones of the Dingle beds rest upon the Hornblendic Series, while at Little River, they transgress from the Killeen Bridge beds on to the Tirnaskea beds, and at Corrycroar rest upon the Corrycroar group and Slate Quarry beds of the Little River group, there appears to be sufficient proof of the strong and irregular folding, accompanying a marked unconformity in pre-Dingle times.

Structure of the District.

Though our work on the Pomeroy district is in some respects only an amplification and extension of the work begun by Portlock, the views expressed in this section are at variance with those put forward by all previous writers. According to our interpretation of the evidence, the structure of the Pomeroy area resembles that of the Moffat district of South Scotland, and the thickness of beds involved is correspondingly small. Portlock supposed it to be 3500 feet; but the present authors can arrive at no higher figure than 500, or at the most 600 feet. Of this they allow about 100 feet to the basal Bardahessiagh beds, and another 100 feet to the fossiliferous flagstones above. The Killey Bridge beds probably include nearly another 100 feet; and the Corrycroar group is exposed to the extent of perhaps 150 feet, leaving 150 feet to include the whole of the Little River group and Tirnaskea beds. If this be so, and the dip be fairly constant at 30° to 50° to the south or south-east,



Fig. 1.

Diagrammatic Section across the Pomeroy District.

the three to four miles of outcrop in a direction tranverse to the general strike demands explanation. Our explanation is that the beds are strongly folded in innumerable shallow isoclinal folds, which are more or less turned over towards the north, and in some of which the middle limb has been replaced by a fault. We may represent our views of the structure diagrammatically (fig. 1), and we may compare this diagram with the somewhat idealized section which we have been able to draw to show the actual relations of the rocks as seen along a line from Craig Bardahessiagh on the north, to the hill of Tirnaskea on the south, crossing the best-exposed portions of the district (fig. 2).

The best evidence, however, is furnished by the distribution of the various beds brought out by the mapping. The most accessible and convincing section is that afforded by the bed of the Little River between the Pomeroy-Bardahessiagh bridge and the Slate Quarry, where, in the space of somewhat less than a mile, some thirty or forty anticlinal cusps with quaquaversal dips appear in the stream. The

Slate Quarry stream, also between the Slate Quarry farm-house and its junction with the Little River, shows some three cores cut transversely; and despite a fairly constant dip of 35° to 40° , the same Graptolite bed appears at the top, opposite the Catholic church, and at the mill-slucice in the alluvial flat at the base of the hill, as well as in the centre of a little fold which occurs half-way between the last two localities. The wave-length of the folds in this section is about 50 to 70 yards, the corresponding amplitude some 30 to 40 feet; and these dimensions seem to be fairly characteristic of the folding of the whole district. Of other evidence, we may quote the fact that, at Mullaghabuoyah, the *M. triangulatus* beds dip south at 75° , but reappear immediately on the other side of the river. At Lime Hill, also, the stream has exposed two very well-marked anticlinal cusps, one of

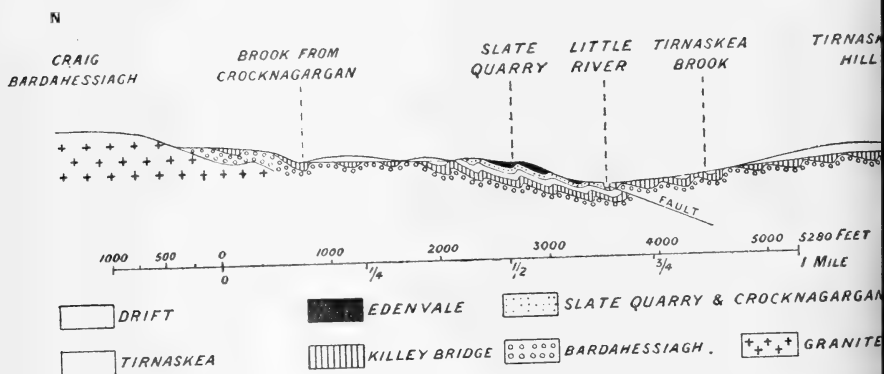


Fig. 2.

which passes into, or is broken by, a fault. In the Tirnaskea stream, two similar anticlinals bring up the *Phacops mucronatus* grits, while the *Æglina* beds, above, as already mentioned, are pinched in, in the syncline between them. At Killey Bridge the exposures are not so clear, but at least three anticlinals are in evidence within the small roadside area available for study, and one of these causes the basal Bardahessiagh beds to be seen in this rather isolated southern exposure.

In each of our diagrams the relationship of the Lower Palæozoic rocks to the granite and hornblendic series below is left somewhat vague owing to lack of evidence. As discussed in the stratigraphical portion of the paper, we believe that originally the Bardahessiagh beds rested unconformably upon the older series; but whether this

relation now remains undisturbed is a matter open to doubt. In the district south-east of Craig Bardahessiagh, we believe that it is maintained; but in the western areas it would seem that the Bardahessiagh beds were involved with the rest, were faulted in addition to being folded, and have been driven forward along the depression determined by the Pre-Silurian outcrop of hornblendic rocks. In this western district, also, as about Lough Bracken, and perhaps further to the north, small areas of Graptolite-bearing shaly drift seem to indicate the former existence of detached patches of true Silurian rocks, which, in the absence of any representative of the Desertcreat rocks once underlying them, must have been thrust forward in advance of the latter, and so have rested directly on the hornblendic rocks. In this connexion it is interesting to note that such faulted shale patches occur only upon the Hornblende schist areas, which, from their nature, determined the existence of hollows in the surface topography in Ashgillian times, as well as at the present day; it may therefore be inferred that a topography, somewhat resembling that at present characterizing the crystalline schist area to the north, dates back to Pre-Silurian times.

Of faulting unassociated with folding we have little evidence; all the faults observed seem only to occupy the place of the middle limb of an unusually sharp isoclinal fold. The most striking example of this is the overthrust fault, which follows, and to some extent determines, the course of the Little River from our most easterly exposures, up to and beyond the Mullagnabuoyah farm. This fault seems to be the result of the breaking-away of a fold somewhat larger than the others, and hading almost horizontally with a slight southern dip, brings up older beds, and allows them to transgress over two or possibly three of the northern synclines. The beds over which the older beds have been pushed are crumpled up into little folds a foot or two in amplitude. Quite near the fault the secondary folds become overturned; and some of the beds take on the appearance of a slate, showing false cleavage or pseudo-stromatism, as viewed under the microscope. Other small faults similar in character are comparatively unimportant, and need not be further discussed here.

As to the age of the folding we have little evidence; but such as we have points to the conclusion that it is at least to some extent Post-Devonian. The Dingle beds appear to share the folding of the older beds, though so brittle that faults often replace folds of the latter; and it is possible that all the folding, as now seen, belongs to the same period, though the existence of an unconformity at the base of the

Dingle series points to orogenic movements of an earlier date; these appear to have been obliterated almost wholly by the movement of later times.

Of the igneous rocks associated with the sedimentary series, we can say very little. Four small masses are indicated on the map; but none of these was found fresh enough to merit a petrographical description. Three of them behave as sills, and are more or less altered sub-acid felsites or acid andesites, and seem at one time to have contained small porphyritic crystals of brown biotite. One of these, occurring at the edge of one of the synclines, behaves as one might expect a rock to do if intruded at or about the time of the folding; but, on the whole, we are inclined to regard all these sills as being connected with the hypersthene andesites of the Old Red Sandstone of Sentry-box Hill, four miles to the south. The relations of the fourth intrusion, a dyke cutting the isoclinal folds transversely in the Little River, west of Mullaghabuoyah—are more obvious; and this is probably the newest rock in the district. It is altered beyond all hope of recognition, and now consists only of the three minerals—quartz, calcite, and shining cubes of pyrites. The great bulk of the rock consists of granular secondary quartz, with sutured junctions. The calcite occurs in granular pseudomorphs, which have the shapes and habit of short prisms of hornblende, though some may also represent crystals of porphyritic felspar. The distribution of the pyrites is sporadic; and the displacement of the other materials around its crystals is obvious.

Comparison with the Lower Palæozoic Rocks of other Areas.

As might be expected, the Ordovician and Silurian rocks of Pomeroy find their closest parallels in the contemporaneously-formed rocks of South Scotland; but whereas the Desertcreat group finds its nearest allies in the rocks of Girvan, the beds of the Little River group are more closely related to their equivalents at Moffat.

Taken as a whole, the Desertcreat group seems to be the equivalent of the Drummuck group at Girvan; and it would appear quite possible to trace even minor divisions through the two areas. The pebbly flagstones of Quarrel Hill at the latter place, with their abundant *Strophomenas*, are the Bardahessiagh beds, but, though conglomeratic, are never seen to rest upon other than Ordovician rocks. The *Trinucleus* mudstones which succeed are exceedingly like the Killy Bridge beds,

with their rich Trinucleus fauna, while the highest sub-division, the Thraive beds, presents many analogies with the Tirnaskea beds.

With other British areas of Ashgillian rocks, we might institute similar comparisons; but the lithological characters are so different that, until more is known of the faunas, such comparisons are of little value; and beyond noting that the classification of the Lake District Ashgillian into a lower division characterized by *Strophomena siluriana* and the Keisley type of fauna, and an upper characterized by *Phacops mucronatus*, appears to hold good, we content ourselves with referring to Dr. Marr's paper on the Ashgillian series in the "Geological Magazine" for February, 1907. Our main fossil-bearing horizon, the Killey Bridge beds, is intermediate between these two divisions; and as it is therefore somewhat newer than either the Keisley or its equivalents, the Rhiwlas, the Robeston Wathen, or the Chair of Kildare limestones, it is not surprising that its faunistic assemblage is more like that of the Brachiopod (Ashgillian) shales of Sweden than of any yet described British Caradocian bed. The general relations of the faunas of our sub-divisions are best seen by reference to the following Table I. The species indicated by a star are peculiar to Pomeroy.

[TABLE I.

In the Little River group the various zones are directly correlatable with the zones of the Birkhill shales of Moffat, and with those of the Skelgill beds of the Stockdale shales of Lakeland.

The CROCKNAGARGAN BEDS, characterized by the presence of *Cephalograptus acuminatus* and *Climacograptus normalis*, are almost certainly equivalent to the *C. acuminatus* zone of both areas; in the succeeding SLATE QUARRY BEDS, *Diplograptus modestus* is, as usual, the predominant form, accompanied by the more striking, though less uniformly distributed, *Diplograptus vesiculosus* and *Cl. medius*.

In the EDENVALE BEDS above, Monograpti make their first appearance, represented by *M. tenuis* and *M. cyphus*. These are accompanied by *Cl. rectangularis*, and a band at the base contains many Dimorphograpti. These Slate Quarry and Edenvale beds taken together probably represent the whole of the zone of *D. vesiculosus* in the Moffat area; but it seems likely that the *Dimorphograptus confertus* zone of the Lake District corresponds more accurately with the Edenvale beds alone. In the overlying MULLAGHNABUOYAH BEDS, the predominant Monograptus is *M. triangulatus*, though *M. gregarius* is present, and, with *Cl. Törnquisti*, seems to indicate that these beds represent the zone *M. gregarius* of Moffat, and the greater part of the beds included in the zones *M. fimbriatus* to *M. convolutus* of the Lake District. The LIMEHILL BEDS, characterized by the distinctive *Monograptus Sedgwickii*, accompanied by *M. discretus* and *Cl. scalaris*, are the equivalents of the *M. Sedgwickii* zone in both areas, while the Petalograptus band at the base may possibly represent the *Cephalograptus cometa* zone.

An interesting point to notice is the succession of species belonging to the Climacograpti.

In the Crocknagargan beds, *Cl. scalaris* var. *normalis* is very abundant; and though this form does range up into the overlying beds, it is nowhere found in such numbers as in the lowest beds. To this succeeds *Cl. medius*, characteristic of the Slate Quarry beds, giving way in time to *Cl. rectangularis*, the predominant Climacograptus of the Edenvale beds. In the Mullagh nabuoyah beds above the characteristic form is *Cl. Törnquisti*; and in the Limehill beds *Cl. scalaris* appears.

It will thus be seen that the division of the beds based upon purely lithological grounds is confirmed by the palæontological evidence, and that each lithological division has a distinct and characteristic assemblage of Graptolite forms.

This is well brought out in Table II., on pp. 124, 125.

PALÆONTOLOGICAL APPENDIX.

Graptolites.

Some of the Graptolites whose names appear in our lists have not hitherto been recorded from any localities in Great Britain or Ireland (*M. acinaces*, *M. nobilis*, &c.); they have, however, been so recently described and figured by Professor Törnquist, of Sweden, that fuller notes upon them would be superfluous.

Others, again (Climacograpti), have been recently described in Part v. of the Monograph of British Graptolites (Palæontographical Society), while a few appear to be new to science. These will be described in the forthcoming parts of the same publication.

Trilobites.

There are several points of interest in the Trilobites of the Desertcreat group, especially as regards the specimens found in the Killee Bridge beds. Many of these, it is true, are well-known forms; but these are accompanied by others whose occurrence appears to be unique; and though many of them were noticed by Portlock in his Report, a few notes may serve to bring his descriptions up to date.

These notes are based, not only upon specimens found by ourselves, but also upon the specimens in the collections of the Geological Survey; and our thanks are due to Dr. Teall, Director of the Survey, for permitting us to examine them.

Trinucleus concentricus Eaton.

The true *T. concentricus* does not seem to be present at Pomeroy. It is, however, represented by several varieties which differ from it in that the glabella in each case encroaches upon the punctate margin of the head-shield, and shows signs of incipient furrows at the base. In each variety the pygidium is alike, and similar to that of the typical form.

Var. **Portlockii** Salt.

Glabella pyriform, prominent, encroaching slightly upon the border of the head-shield; furrows indistinct or absent.

Cheeks about as long as broad.

Border, punctate, not folded as in *T. concentricus*, but lying in one plane.

Three rows of punctures in all in front of glabella, tending to become confluent in a radial direction.

It is noteworthy that the appearance of the punctate border varies

with the preservation. If the upper portion has been stripped off, two rows are to be seen separated from the remainder by a groove.

Horizon and Localities.—Killey Bridge beds. Little River, Tirnaskea, Killey Bridge.

Var. **elongatus** (= *Tr. elongatus* Portl.).

Closely allied to var. *Portlockii*, but having the glabella more pyriform and the cheeks longer than broad.

Horizon and Localities.—Killey Bridge beds. Little River, Tirnaskea.

Var. **arcuatus**.

Glabella.—Ovoid, encroaching upon the border of the head-shield; furrows absent or imperfect.

Cheeks.—Broader than long.

Border.—Rows of punctures fewer in number than in var. *Portlockii*; two to three rows in front of glabella; while near genal angles, which are rounded or somewhat pointed, there are four rows of punctures, with an inner row of slit-like furrows encroaching upon the outer margins of the cheeks. Posteriorly the margin of the head-shield is not straight, but curves forward at the extremities; hence the genal angles are in advance of the rest of the margin.

This form appears to be the same as one mentioned by Portlock as being intermediate in character between his *Tr. latus* and *Tr. fimbriatus*; but these two forms appear to be identical.

Horizon and Locality.—Killey Bridge beds. Little River, Tirnaskea.

Trinucleus seticornis His.

Head.—Shield semicircular, with punctate border, broad and folded ventrally at right angles to plane of the thorax; two anterior rows of tubercles, separated from the rest by a pronounced groove. Genal angles with long spines.

Glabella.—Globose, separated anteriorly from cheeks by deep furrow; glabella furrows, three in number, including neck furrow.

Cheeks.—Prominent, each with tubercle at the summit.

This description agrees on the whole with that of Portlock; but his figure shows neither the folding of the border nor the groove, which is, however, only visible where the upper surface is stripped off.

Horizon and Localities.—Killey Bridge beds. Little River, Tirnaskea.

Dionide cfr. **euglyptus** Ang.

Head.—Semicircular to triangular in outline; genal angles spined.

Glabella.—Circular, inflated with two furrows, starting from the neck furrow, and running forwards and sideways so as to cut off

two basal lobes. A single glabella furrow connects the two. At the summit of the glabella there is a tubercle. Neck furrow clearly defined.

Cheeks.—Triangular and covered with pits, arranged in anastomosing grooves.

Eyes.—Absent.

This species is represented in our collection by an almost perfect head.

Horizon and Locality.—Killey Bridge beds (?). Little River, Tiraskeas.

Æglina rediviva Barr.

Head-shield.—Circular, with rounded genal angles.

Glabella.—Smooth, and but faintly defined by two shallow axial furrows at the posterior margin.

Cheeks.—Lateral margins flattened where eyes attached.

Eyes.—Not preserved.

Thorax.—Axis occupying more than one-third the entire breadth of the body; segments five in number; pleura grooved and rounded at extremities.

Pygidium.—Semicircular; slightly inflated; about as large as head (excluding eyes).

Axis short, truncated, with one or two furrows; tail-segments faintly indicated by two shallow grooves; margin flat.

This Trilobite is represented in our collection by narrow scattered head-shields and pygidia, with or without thoracic segments. One complete specimen was found 4.5 mm. in length, but some of the larger specimens must have measured fully 10 mm. when perfect.

In some of the specimens the axis of the tail appeared to be somewhat larger than in others, and to be more tapering. This may be due to age.

Horizon and locality.—Upper Tiraskeas beds. Tiraskeas.

Of the other Trilobites collected from Pomeroy upon this occasion little need be said; they have mostly been described by Portlock in his Londonderry Report.

Remopleurides Colbii and *R. dorsispinifer* were both identified; cephalic shields and pygidia of *Phacops (Dalmanites) mucronatus* (Brong.) were abundant in the Tiraskeas beds.

Phacops truncato-caudatus (Portl.) was represented by portions of head and pygidium, and seems to differ slightly from Portlock's description in having a slightly narrower glabella. Our specimens agree in every respect with those previously collected from Pomeroy, now preserved in the Sedgwick Museum, Cambridge.

We thus arrive at a general correlation of the beds, which may be summarised as follows:—

POMEROY.	S. SCOTLAND.		LAKE DISTRICT.	S. WALES.
	A. Girvan.	B. Moffat.		
Limehill beds.		Zone of <i>M. Sedgwickii</i> .	Zone of <i>M. spinigerus</i> .	
Mullaghnabuoyah beds.		“ “ <i>M. gregarius</i> .	“ “ { convolutus. “ “ { fimbriatus.	
Edenvale beds.		“ “ <i>D. vesiculosus</i> .	“ “ <i>D. confertus</i> ?	
Slate Quarry beds.		“ “ <i>C. acuminatus</i> .	“ “ <i>C. acuminatus</i> .	
Crocknagargan beds.				
Timaskea beds.	Thraive beds.			{ Slade beds. Redhill beds.
Killey Bridge beds.	Trinucleus Mudstones.		{ Ashgill Slates. Keisley Limestone.	{ Sholeshook Limestone.
Bardahessiagh beds.	Quarrel Hill beds.			

EXPLANATION OF PLATE VIII.

Trinucleus concentricus var. *Portlockii* Salt. Figs. 1, 2.

1. Cephalic shield, not quite complete.
Quarry close to Little River, Tiraskea.
2. Do. Do.

Var. *elongatus* Portl. Figs. 3, 4.

3. Cephalic shield, nearly perfect.
Quarry close to Little River, Tiraskea.
4. Portion of cephalic shield showing characteristic glabella.
Quarry close to Little River, Tiraskea.

Var. *arcuatus* var. nov. Figs. 5, 6.

5. Cephalic shield, nearly perfect.
Quarry close to Little River, Tiraskea.
6. Cephalic shield, fragment. Do.

Trinucleus seticornis His. Figs. 7, 8.

7. Side view of cephalic shield, showing fold over.
Quarry close to Little River, Tiraskea.
8. Cephalic shield, nearly perfect, showing tubercles on cheeks.
Quarry close to Little River, Tiraskea.

Dionide cfr. *euglyptus* Ang. Fig. 9.

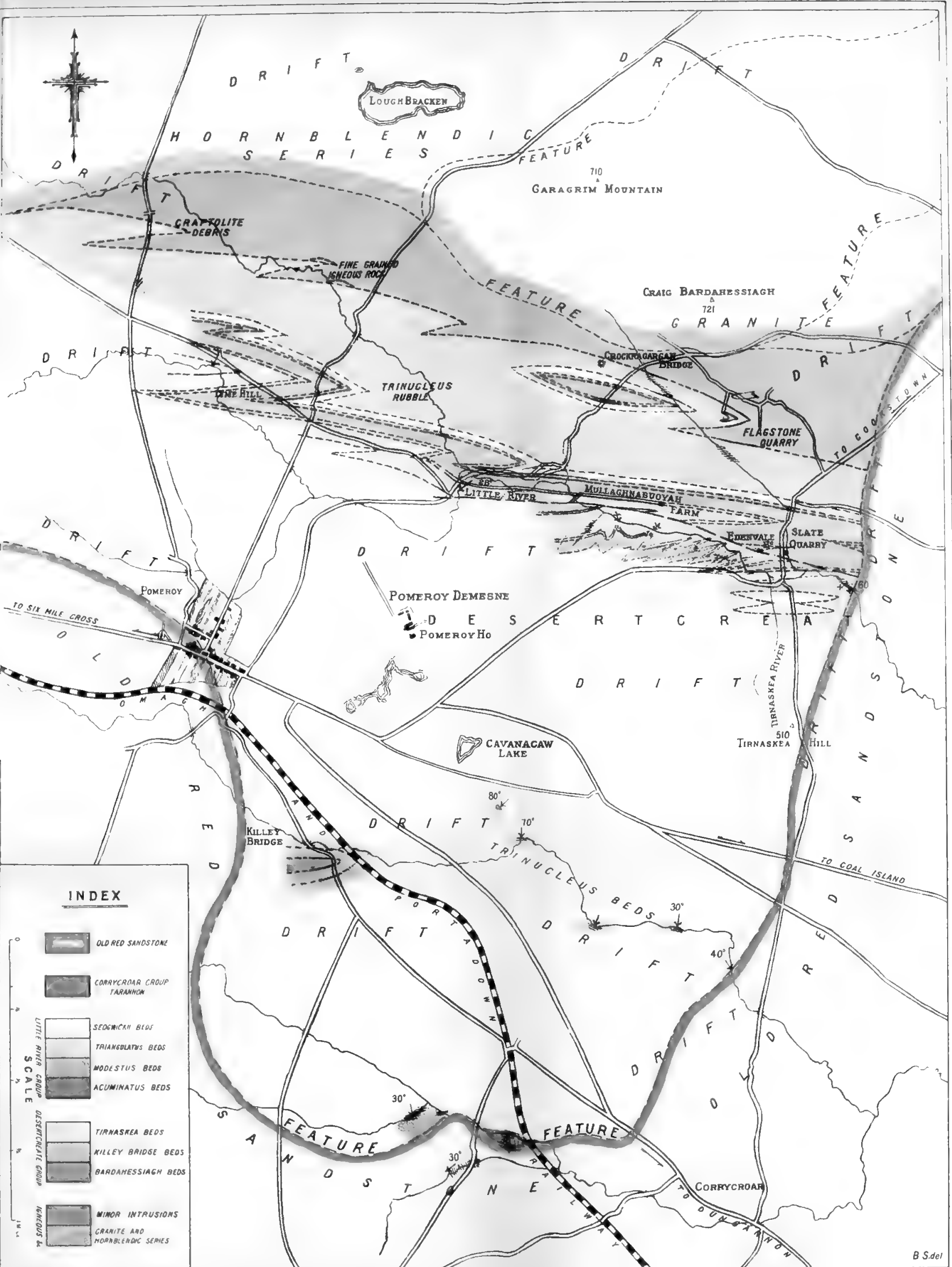
9. Cephalic shield, nearly perfect. Little River, Tiraskea.

Phacops mucronatus Brong. Figs. 10-13.

10. Cephalic shield, showing glabella and free cheeks.
Tirnaskea River.
11. Less perfect specimen, showing glabella and free cheeks.
Tirnaskea River.
12. Fragment of large cephalic shield, showing portion of glabella
and eye. Tirnaskea River.
13. Pygidium. Tirnaskea River.

Æglina rediviva Barr. Figs. 14-16.

14. Pygidium of small individual. Tirnaskea River.
15. Pygidium of large individual. Tirnaskea River.
16. Nearly perfect small individual, somewhat contorted.
Tirnaskea River.



INDEX

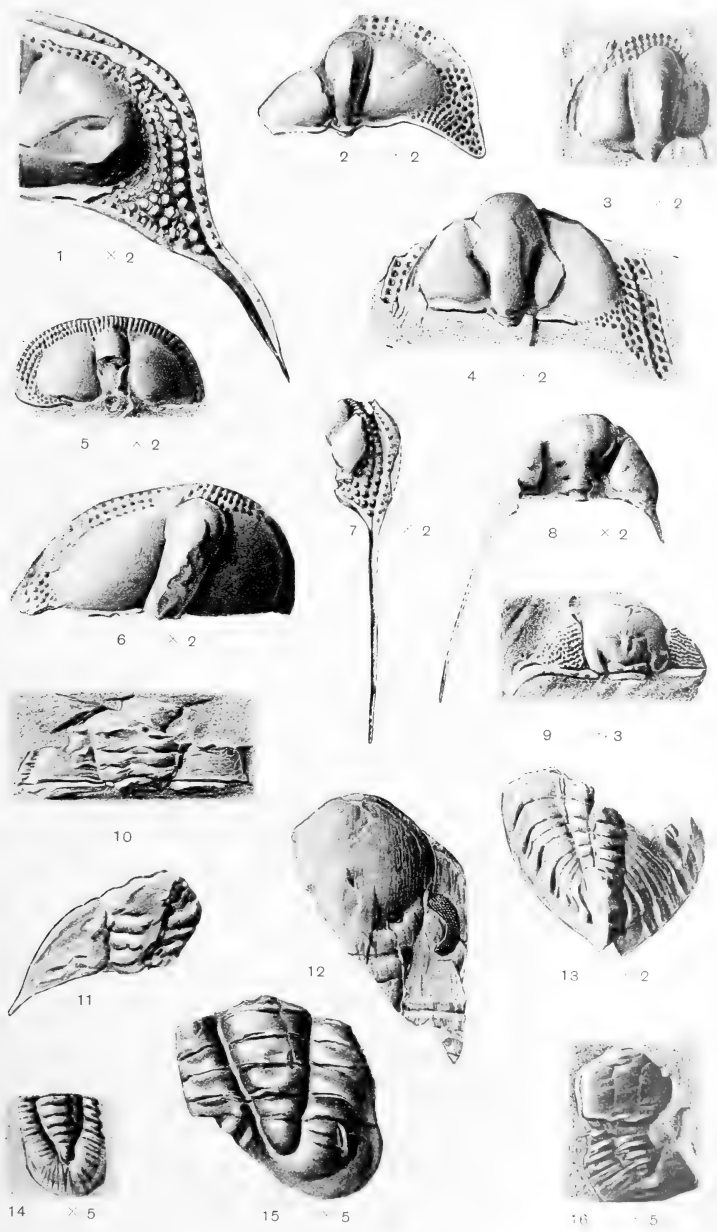
[Symbol]	OLD RED SANDSTONE
[Symbol]	CORRYCROAGH GROUP TARANNOON
[Symbol]	SEGWICKI BEDS
[Symbol]	TRIANGULATUS BEDS
[Symbol]	MODESTUS BEDS
[Symbol]	ACUMINATUS BEDS
[Symbol]	TIRNASKEA BEDS
[Symbol]	KILLEY BRIDGE BEDS
[Symbol]	BARDAHESSIAGH BEDS
[Symbol]	MINOR INTRUSIONS
[Symbol]	GRANITE AND HORNBLENDEIC SERIES

LITTLE RIVER GROUP
DESCRIBED GROUP
IGNEOUS &
SCALE

FEARNSIDES, &c.—GEOLOGICAL MAP OF POMEROY DISTRICT

B S del





C. A. Brock, del.

Boscawen, Dorset.



X.

THE SILURIAN AND METAMORPHIC ROCKS OF MAYO
AND NORTH GALWAY.

By J. R. KILROE.

[COMMUNICATED WITH THE PERMISSION OF THE DIRECTOR OF THE
GEOLOGICAL SURVEY OF IRELAND.]

PLATES IX, X.

Read JUNE 24. Ordered for Publication JUNE 26.

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It is usually gratifying to consider the way-marks which line the path of geological progress, but not always a pleasing experience to read past conclusions in the light of present knowledge. Hypotheses which temporarily serve useful ends are apt to become stereotyped in the hands of a few, and in this form tend to hinder rather than aid inquiry. Geological maps, which can only aim at presenting summaries of facts, necessarily display a colouring of the views according to which the facts were grouped; and for this reason they are liable to share the fate of superseded hypotheses. In so far, however, as they afford guidance to points of geological evidence, they are always valuable.

The area here described extends from the north coast of Mayo to the Maamturk range in Galway, and comprises the areas represented on the published 1-inch sheets of the Geological Survey of Ireland, numbers 39, 40, 51, 52, 62, 63, 73, 74, 75, 83, 84, 85, 93, 94, 95, issued in the years 1869 to 1879; with accompanying Memoirs, the last of which was issued in 1881. It would be odd indeed if a quarter of a century's geological research at home and abroad did not beget such increase of light, and changes in point of view, as demand a revision alike of the evidence and conclusions upon the strength of which the mapping was originally planned. This will best be understood when the nature and bearing of some factors in the case are here stated; and first as regards the Silurian strata, thus:—

1. Fossils occurring usually in, and by some even at the time believed to be fairly determinative of, Caradoc rocks, had been

collected on the flanks of Mweelrea (*Meoulrea*). This mountain, ascending from the north shores of Killary Harbour, is nevertheless shown on the published maps as consisting of Wenlock strata. Only the topmost beds seem to hold so high a place in the Silurian group as Llandoverly.

2. Strata south of Leenane considered to be Llandoverly were represented as passing directly up into the Ludlow division, the Wenlock series being entirely omitted; though this was believed to exist in force as we have just seen in Mweelrea, that is, in the immediate vicinity.

3. A well-marked series containing Brachiopods and turbinated corals, and in a few places *Pentamerus Knightii*, was relegated in parts to the Wenlock and in parts to the Llandoverly group.

4. A volcanic zone with fossil-bearing ash of Caradoc or Bala Age, and grits also containing fossils of this age, was represented as having been faulted up near Toormakeady amongst Llandoverly strata; although the succession seems obvious and unbroken.¹

Such instances are sufficient to indicate the necessity for a revision of the published work; and a rapid re-survey of the ground was planned by the late Director-General, Sir Archibald Geikie, and allotted to me. The re-examination, though limited in time for so large a tract, brought to light several new points of evidence, the chief of which may here be summarized, following those previously mentioned, in numerical order:—

5. The coral-zone mentioned above occurs in the ground represented as mica-schist—"Metamorphosed Lower Silurian"—2½ miles south-west of Croagh Patrick summit.²

6. Beds of the same zone, very slightly altered, which yielded to me specimens of a turbinated coral, now in the Museum Survey collection, appear half a mile west of Croagh Patrick summit, brought up between two limbs of the associated quartzite (see p. 158)

7. This zone, known to exist near Lough Mask, was traced westward by Maam to the coast near Kylemore; and, occurring as it does near the base of a great grit series, justifies the change of

¹ From Llandeilo or Arenig grit and coarse, massive conglomerate, through associated block slate, into overlying felsite, calcareous ashes with Bala fossils and limestone beds. The felsite may perhaps lie unconformably upon the black slate.

² At Bohé. During a recent visit to this locality with the present Director of the Survey, Professor Cole, some newly quarried flags yielded *Pentamerus* and other forms.

name of this series from Llandoverly, as on the published map, to Wenlock. This series duly passes by uninterrupted sequence upward into the Ludlow beds south and south-west of Leenane.

8. The zone, which is of paramount worth in the interpretation of the region, became recognizable in three bands in consequence of anticlinal and synclinal plications and other dislocations (*a*) at Croagh Patrick, (*b*) at Knockfadda and Cregganbaun, and (*c*) near Toormakeady, Maam, and Kylemore.

9. The recognition of the Wenlock rocks of Croagh Patrick in Clare Island between two faults, *brought up* thus amongst beds similar to the red "Salrock Slate" of Ludlow Age, south-west of Leenane, seems by inference to show that beds of this age exist in Clare Island and along the coast west of Louisburgh, where corresponding red slate and fine grits appear. I failed to find fossils of any kind in this series.

10. The series of coarse grits and conglomerates immediately south-west of Leenane Hotel, represented as Wenlock strata on the published map, contains black and dark grey slate, and chert bands, which yielded Graptolites of Arenig or Lower Llandeilo Age. This discovery obviously necessitated a radical change in the representation.

11. A series of highly cleaved lavas near Glenawough Lough—an extension of the volcanic zone already known near the western shores of Lough Mask—may also be mentioned as an interesting element of the geology of the region not previously recorded. The rocks are highly cleaved, and, equally with much of the sedimentary group, were shown as ordinary metamorphic strata.

By means of the foregoing fresh points of evidence the geology of the region is reducible to a form more in accord with the natural stratigraphical arrangements and sequences recognizable elsewhere, and even with most of the originally observed facts. The chief results of the work have been mentioned in the Summaries of Progress of the Survey's operations for the years 1893 and 1894. Hitherto the other claims made on the time of the Survey have not permitted such detailed examination of the Mayo area as would justify the issue of maps containing considerable revisions. The Drift Map accompanying the Department of Agriculture's book¹ on the Soil Geology of Ireland represents a revised view of the geology of the region; and a map is here shown giving this in somewhat greater detail. Before

¹ By the present Author.

referring to it, the metamorphic series lying to the north and south of the Silurian basin must be described, so that the elements of the geology of the entire region may appear in duly ascending order.

The complexity of the stratigraphy of the Silurian tract may well account for incomplete appreciation of its geological structure at the outset; and a similar reflection *à fortiori* applies in the much more intricate case of the dislocated, over-folded, and highly altered rocks—chiefly crystalline schists, quartzites, and igneous masses, most of them deformed—which form the crust in North Mayo and Connemara. Since the publication of the Government maps and memoirs of these regions, a few papers referring to their geology have appeared, as well as references in the yearly Summary of Progress, according as increase of light seemed to justify different views of the structure. It has been generally recognized by the Survey staff that deficient light upon structural geology and metamorphism had tended to render the original mapping considerably obscure. Thus, since the year 1881, the application of Professor Heim's Alpine observations to North-West Scotland, by Professor Lapworth and the officers of the Scottish Survey, under the direction of Sir A. Geikie, resulting in the discovery of transformations effected in North-West Scotland, by movements along a series of successively out-cropping thrust-planes, had thrown a flood of light upon the geology of the Irish metamorphic regions. This was availed of in the interpretation of West Donegal, which was mapped in the years 1885–90, and in the revision of the corresponding metamorphic regions of Mayo and Galway.

Another factor which has especially contributed to differences between recent and older views of our rocks is the effect of dynamical metamorphism; this was not at all realized when Mayo and Galway were originally surveyed: I refer to the mylonization or shearing of igneous and sedimentary rocks alike, attended with the formation of mica at the expense of the felspars, and the consequent production of gneiss and mica-schist from granite masses.

Until the close of the seventies in last century some of the granites were regarded, in Ireland at least, as the extreme limit or climax of metamorphism of sedimentary strata;¹ and when dynamical metamor-

¹ That gneisses are, in some instances, due to the metamorphism of sedimentary strata is now claimed. Van Hise writes (Monograph on Metamorphism, p. 783):—"I propose to confine the term 'gneiss' strictly to its structural sense, including all finely-banded crystalline rocks, whether of igneous or aqueous origin." And as regards granite, he has the term *gneiss-granite*, as well as *granite-gneiss*;

phism was admitted as a factor in alterations of the rocks, a disposition was apparent to swing to the opposite extreme in regarding schists included in the granite as the extreme deformation of portions of the igneous rock, in many more cases than the circumstances justified, rather than as included masses and tongues of altered sedimentary strata, containing perhaps a proportion of infiltrated granitic material from the surrounding magmas.¹

To understand how these changes of view affected the reading of our intricate and puzzling metamorphic areas, and ultimately led to settled and, as I venture to maintain, satisfactory conclusions, it is necessary to refer to the history of the opinions and controversies which have obtained since the publication of the Government maps and memoirs.

At Erris Head, the northern extremity of the Mullet peninsula in Mayo, and near the town of Belmullet, occur coarse gneisses, which long had been supposed to be of Archæan Age. In the Survey Memoir of this region (Sheets 39, 40, 51, 52, 62), Professor E. Hull mentioned the "possible presence at Belmullet of gneiss belonging to the Laurentian formation" (see preface); and on p. 14 of the same he compared the rocks west of Belmullet with those around the village of Rhiconich, and along the shores of Loch Laxford in North-West Scotland. Dr. Hull also described the gneiss somewhat in detail in a paper, "On the Laurentian Rocks of Donegal and other parts of Ireland"; and mentioned its occurrence in Slieve Gamph and the Ox Mountains, and in South-West Galway.

WORK OF REVISION.

In the year 1890 the Geological Survey entered upon a revision of areas already mapped; and the Director-General, accompanied by Messrs. Peach and McHenry and the late Dr. Hyland, made traverses in the west, with a view to deciding as to the age of the supposed Archæan rocks in the regions of Belmullet, Achill, and Galway. The traverses resulted in the confirmation, at the time, of Professor Hull's views as regards the similarity of the Galway rocks to the Scottish Archæan—both lithologically and in their present surface features; and

and uses the descriptive term *mica-quartz-felspar-schist-granite* for Aurola granite, which implies his recognition of its derivation from aqueous rocks.

¹ This change of view amongst some geologists is referred to by Prof. G. A. J. Cole, M.B.I.A., F.G.S., Director of the Survey, in his paper, "On a Hillside in Donegal," *Science Progress* No. 2, October, 1906, pp. 16, 17.

the striking similarity of the rocks at Erris Head to those at Cape Wrath in Sutherland was also recognized.¹ A group of rocks in the extreme west of Achill Island, consisting of micaceous and graphitic schists, limestone, &c., was then also taken to be of Archæan Age, and to have formed the ancient floor of the younger or Dalradian metamorphic series, commencing with the conglomerates and quartzite of Croaghaun Hill.² This hill rises steeply upward from the hollow near Achill Head, where the schists, &c., are seen, and is sharply truncated by imposing cliffs of remarkable grandeur overlooking the Atlantic westward.

The Director-General further made traverses in 1892 of the Ox Mountain chain with Messrs. McHenry and Watts, I, too, accompanying them, by Foxford and Lough Talt to Ballina. The traverses issued in decisions upon two important points, viz. :—

(a) That the range north-eastward from Castlebar to Manorhamilton consisted of Archæan granites and granulites.

(b) That a line observed on previous traverses running northward from near Castlebar, and apparently an unconformable boundary, should be taken as a base-line of the Dalradian series.³

Mr. McHenry had previously noted that the rocks of the Ox Mountain range near Collooney were of igneous origin, though now transformed into gneisses,⁴ which are usually much gnarled and contorted; and the observations proved to be of valuable aid in the interpretation of the geology of this ancient ridge. Limestones and epidiorites are included in the gneisses and granites near Lough Talt; and these appeared to me, during the traverse, to correspond to similar inclusions in the Donegal granites, which in 1884⁵ were decided to be *more recent* than the Dalradian schists.

¹ Transactions of the Roy. Dub. Society, vol. i., 1877-1883, pp. 252, 253, by Ed. Hull, LL.D., F.R.S., Director of the Geological Survey of Ireland. He also published his views about the same time in "Nature," 1881, pp. 81, 82; and at the British Association meeting of 1881. Mr. G. H. Kinahan, too, in 1881 (Geolog. Magazine, Sept.) referred to the occurrence of these in the above-mentioned areas; and later, in a paper read January 15, 1891, before the Edin-Geo. Soc. he made reference to the discussion on these rocks.

² See "Recent Researches into the Origin and Age of the Highlands of Scotland and West of Ireland," by Sir A. Geikie, LL.D., F.R.S., Proc. Roy. Institution of Great Britain, vol. xii., Part III., No. 82, p. 528, *et seq.*

³ Annual Report of the Geological Survey and Museum of Practical Geology for year ending December 31st, 1892, Appendix E, p. 267.

⁴ Described in some detail in a Paper read before the Royal Irish Academy. Proceedings, vol. xxiv., sec. B., Part 4, p. 371.

⁵ Explanatory Memoir of Sheets 3, 4, 5, 9, &c., p. 54.

The revision of the Castlebar and Ballina district on the lines decided upon by the Director-General was completed by Mr. McHenry in 1893,¹ at which stage of the survey work it was believed that in the area now under description :

1st. Archæan rocks existed in Belmullet Peninsula, at Achill Head, in the Ox Mountains, and south-east of Clifden in Galway, as well as probably at Kylemore, near Leenane.

2nd. The younger schist series extended away from these tracts of Archæan, and had a visible base at two points at least, viz. : near Achill Head, and north-west of Castlebar.²

My connexion with the problems involved dates back to 1892, when I was instructed to gather what information I could, for future use in mapping, first, in the region of Belmullet. Going northward to Erris Head, I was somewhat puzzled to find that the coarsely-crystalline gneiss alternated with thin bands of dark-gray mica-schist in such a manner as to suggest the invasion of an originally sedimentary series, by massive bands of coarse pegmatitic granites. I was further perplexed to discover roundish-flattened pebbles (or fragments which looked extremely like pebbles) in fine-grained gneissose rocks near Erris Head, which had been taken for mylonized igneous masses, originally like the coarse pegmatites. I then concurred, and do now, in the original reading of these fine-grained gneissose rocks, in which they were described and mapped in 1876 as quartzites; and the same remark applies to the continuation of this series across Broad Haven, where it forms the cliffs at Benwee Head, and eastward to Belderg.

Coarse pegmatitic gneiss forms the middle portion of the Mullet, west and south of the town; and there, during my examination of the ground in 1892, I also found the gneiss to contain lenticular masses of black slate.

It appeared to me then, and there is now no doubt regarding the conclusion, that the supposed Archæan gneisses of this region had been intruded as pegmatitic granites into the Dalradian series; that

¹ Summaries of Progress, 1892 and 1893. Annual Report of the Geo. Surv. and Museum of Prac. Geology, Appendix E, 1892, p. 267; 1893, p. 270.

² It may be noted that the debatable point whether Archæan rocks occur amongst the Dalradian, or whether the latter should be regarded as Archæan, is not here discussed, or even touched upon. The senses in which the terms are used throughout the Paper are those accepted by the Geological Survey (say) in 1890. The Archæan rocks were then regarded as probably Azoic, possibly the original crust; the Dalradian as consisting of an entirely newer series of sedimentary origin, probably once fossil-bearing, though now for the most part highly metamorphosed.

the member invaded was chiefly the black and dark-gray slate or schist underlying the quartzite; and that the pebbly or conglomeratic beds that I noticed near Erris Head represent the boulder-deposit which forms so distinct a zone between dark-gray schist below and quartzite above, throughout Donegal.

Early in 1893, I undertook the examination of the metamorphic region north of Castlebar; and here, it seemed to me, upon examination of the supposed base of the Dalradian series, that it was in reality the sole of a thrust plane, which leaves the rocks on each side practically of the same age; and that the rounded pieces of rock, taken for water-worn pebbles embedded in younger strata, are but detached lumps rounded by movement beneath the over-thrust mass. I could not distinguish the rocks, described as Archæan (sheared) granulites north of Castlebar, from ordinary mica-schist and sheared grits, and found in these rocks, in proximity to the Lough Conn granite, the following section, which proves the granite to be distinctively intrusive, rather than an unsheared band of Archæan rock from which the adjoining supposed granulites had been formed by intense shearing:—

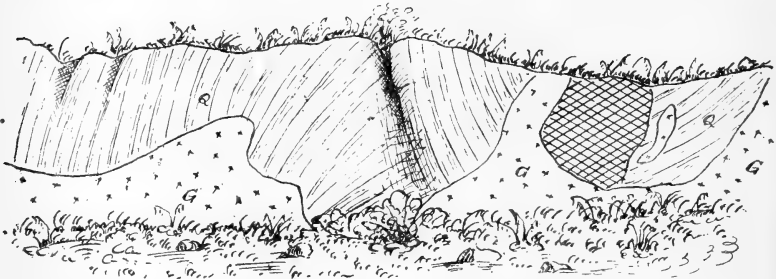


FIG. 1.—Sectional View, nearly two miles N. of Castlebar, showing micaceous and felspathic quartzite (Q) and epi-diorite (cross-hatched), invaded by granite (G).

I also found in this series an unquestionable quartzite band, indicative of the existence in the series of undoubted sedimentary strata.

These observations, therefore, in the Castlebar as in the Belmullet tracts, convinced myself that Archæan rocks, according to the original acceptance of the term, do not exist there. The coarse, pegmatitic gneisses of the Mullet have invaded the Dalradian series; and the metamorphosed sedimentary rocks north of Castlebar, invaded by the granites and gneisses of the Ox Mountains, equally belong to the

Dalradian system. As previously stated, I do not discuss whether this latter should be termed Archæan; neither do I attempt here to fix the position of the Dalradian with reference to the Cambrian or Ordovician system.

The Director-General, in his summary of the work done in 1894, mentions that Mr. McHenry also came to the conclusion that the supposed Archæan rocks of Connemara penetrate the mica-schists, limestones, and quartzites of that region. He had "collected a body of evidence which disproves the existence of any Archæan rocks, at least within the area examined."¹

From the foregoing it will be seen that we cannot now deal with the Dalradian rocks as a series built up from a recognizable base; it has, however, been possible to reduce the congeries of strata represented on the published maps to such order as justifies my speaking of it as a *system*, consisting of well-established members. These, in broad outline, are mica-schist with fine and coarse cleaved grits below, and a quartzite group above, with an intermediate zone containing black schist, limestone, and pebbly (or conglomeratic) beds, which thickens generally westward to an important deposit. The system is identical with that established in Western Donegal, even to the fact that the conglomeratic or boulder-deposit assumes large proportions westward, as on the coast to the west of Slieve League; and the system is traceable throughout North-West Mayo and West Galway, often with reversal of dips, attendant upon remarkable over-foldings and dislocations. The three members of the intermediate series, or zone, are not always recognizable together; the limestone is fairly persistent, and, having been noticed at several new points, it has supplied an important means of locating the zone, where the quartzite and schist series are not to be seen in close proximity in the generally obscure ground of North Mayo. The pebbles in the boulder-deposit may be in places few and small; sometimes they are of very large

¹ Ann. Report of the Geo. Sur. and Museum of Pract. Geo., for year ending December 31st, 1904, Appendix E, p. 290. The conclusions thus reached by Mr. McHenry in Galway, and by me in Mayo (1892-93), possess considerable significance, in view of the universally-conceded lithological similarity and geographical resemblances of our rocks to those in Sutherland. Nor is the significance at all diminished by the fact that recognized Archæan gneiss seems to penetrate mica-schist, graphite, dolomite, and quartzite at Lough Carron and Gairloch (Ancient Volcanoes of Great Britain, vol. i., p. 115). Is there any good reason for supposing that these clastic rocks are not of Dalradian Age, and that the gneisses which penetrate them are not, like our own, of *subsequent date*?

size, and well-rounded—for the most part consisting of coarse granite—and sometimes they are crushed beyond recognition, as in the peninsula between Cleggan Bay and Ballynaskill Harbour, in North Galway. The black slate is also fairly persistent, usually below, sometimes above the limestone, and occasionally containing pebbly seams and boulders, as at Keem and Doogort, in Achill, respectively.

Accounts of the views to which I have been led during the revision-work, embodied in two papers,¹ were submitted to the British Association at its Glasgow meeting in 1901, in which references were made to the order and mode of occurrence of the different formations represented in Mayo and Galway; but the accounts were necessarily very brief. Mr. McHenry has set forth his views regarding the Ox Mountains in a paper read before the Academy, already alluded to in this description. The present account is intended to supply important details met with in the course of my own work, and not previously published in connected form. They may furnish some aid in the formation of a future set of maps of this exceedingly interesting and instructive region. The value and bearing of the details may be judged from the following connected account:—

METAMORPHIC SERIES. *North Mayo.*

The coarse gneisses of Erris Head, as we have seen, are not the most ancient metamorphic rocks; on the contrary, they are but crushed, coarse-grained granites, or pegmatites which have been

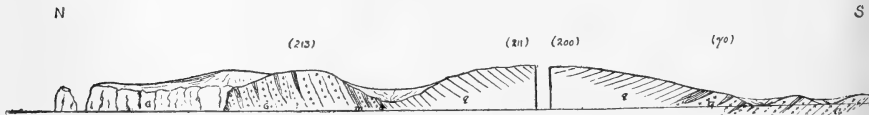


FIG. 2.—View of Erris Head (N) and section southward, showing coarse pegmatitic gneiss (G), mica-schist (m), pebbly deposit (b), and quartzite (q).

intruded into mica-schists, immediately underlying the great quartzite group, well represented in North Mayo. Thus if a section be taken three quarters of a mile west of Erris Head, running south-south-west,

¹ Report for 1901: "On the Relation of the Silurian and Ordovician Rocks of the North-West of Ireland to the great Metamorphic Series," by J. R. Kilroe and A. McHenry, p. 636; and "On the Relations of the Old Red Sandstone of North-West Ireland to the adjacent Metamorphic Rocks, and the Torridon Rocks of Scotland," by A. McHenry and J. R. Kilroe, p. 636.

it traverses alternating mica-schist and coarse gneiss-bands or lenticular masses, passes close to the point where I found the rounded pebbles in the fine-grained gneissose rock, and shows also the stratigraphically overlying quartzite. The northern part of the section indicates the circumstances just explained.

I concur in giving to the rock the name of quartzite, under which it was represented when the ground was originally surveyed in 1876, by Mr. McHenry, although it contains a considerable proportion of mica, and some felspar; and in going eastward the proportion of felspar grains increases, while that of the mica diminishes, in beds which, though stratigraphically higher, are obviously of the same quartzite group. These beds are well to be seen along the low, jagged cliffs near Cone Island. Crossing Broad Haven, the entire section along the cliffs from Benwee Head, eastward to the Carboniferous boundary near Belderg, shows similar variations from the purest type of quartzite; only at a point about half way between the two points named, does purely silicious quartzite occur, but as part of the series.

Passing across the vast peat-covered tract where the rock is rarely to be seen even in stream courses, we reach the indistinct escarpment of Glencalry, formed of the same gneissose-looking rock seen near Erris Head, and here and there throughout the tract just mentioned east of Broad Haven. This rock is here, also, correctly described on the published map as micaceous quartzite; and it is seen to pass under a series of beds consisting chiefly of mica-schist and limestone, with some quartzite bands, or single band overfolded and repeated. The mica-schist—which here becomes obscured by the supervention of Carboniferous strata—spreads out westward so as to cover a wide area, and appears to form an important member of the metamorphic series, forming Barnacuillev (875), Knocknalower (612), and Aghoos (348) hills. A limestone zone marks the boundary of the mica-schist near Aghoos, as well as at Glencalry; it is to be seen at Kilcommon Rectory, in the small stream draining Carnhill. This boundary-line between the mica-schist and quartzite passes around the north shoulder of this hill, to the shore of Broad Haven, which it crosses, is taken up again at Portnacally, and traced south-westward, to become lost in the obscure ground north of Belmullet. North-west of Belmullet, however, the circumstances observable near Erris Head are repeated; for on the coast near Scotchport Rock the coarse, pegmatitic gneiss is again to be seen invading the passage beds from the mica-schist group—portions of which are included in the coarse

gneiss—and the micaceous quartzite which dips away northward, to form a synclinal basin with the Erris Head quartzites, as shown in the section above given (p. 138).

Limestone does not appear in the neighbourhood of the junction here, just as it does not appear near the junction at Erris Head; but in following the boundary of the two groups eastward by Portnacally, it is marked by the presence of limestone beds which reappear on the same line on the eastern shore of Broad Haven, as well as at Kilcommon and Glencalry, as before mentioned. Were the ground not almost entirely obscured by peat, drift, and local surface coverings, there is little doubt it would be found that the occurrence of limestone characterizes the boundary zone between the mica-schist and quartzite throughout, except in the western part of the Erris Head peninsula, known as the Mullet.

Now, the mica-schist at present *overlies* the quartzite series east of Broad Haven, while at the west coast of the Mullet it occupies its normal stratigraphical position, that is beneath the quartzite; so that we are obviously dealing only with two main series instead of three, as might at first sight appear. A good section exhibiting the inverted conditions of the groups is to be seen in Glencalry. Here the micaceous quartzite may be followed bed after bed, dipping at 20° to 25° towards a cascade, where the stream tumbles over a rugged bed formed of mica-schist and limestone. The section here given represents the relations thus described and, diagrammatically, that of the quartzite group to the mica-schist and gneiss at Erris Head 21 miles to the west.



FIG. 3.—General Section from Erris Head hill (213) across Broad Haven eastward to Glencalry hill (562) showing gneiss (G), quartzite (q), limestone (lst), and mica-schist (m), faulted beyond overfold.

I need only refer to the overfoldings to be seen in the corresponding quartzite group in Donegal, and described in the Memoir of Sheets, 1, 3, 9, &c., to indicate how fully we should expect to find such inversions of the metamorphic strata as that above shown; and further, to expect minor puckerings of the strata, which would account for repetitions of one limestone band, instead of several, as might at first sight appear to be the case at Glencalry. A more detailed section of the glen and river-bed is shown on next page.

The boulder-deposit which, equally with limestone, marks the junction-zone of the two great groups in parts of Donegal, is not represented at Glencalry, while it is represented, as we have seen, though without limestone, at Erris Head.

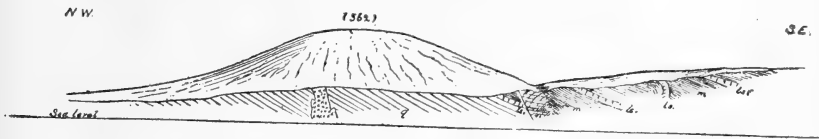


FIG. 4.—Detailed section at Glencalry, showing quartzite (*q*) invaded by epidiorite, over-riden by mica-schist (*m*) and limestone (*ls.*), along reversed fault.

East of Belmullet the quartzite occupies a large area spreading out so as to surround Carrowmore Lough, and form Glencastle Hill (760), Knocknascollop (788), and Carrafull Hill (890), which is separated by Bangor Gap from Knocklettercuss (1208), the north-west spur of the Corshieve range (2369): all the hills named consist of quartzite. The divisional zone between the quartzite and mica-schist below it is marked as usual by a limestone band, which runs east by south from Belmullet to Bangor; and at the western end of Carrowmore Lough, where the stream draining it issues, the quartzite is denuded to such an extent as to reveal the limestone accompanied by a conglomeratic band, and the mica-schist beneath. This is shown in the following section.



FIG. 5.—Section across Glencastle Hill and Carrowmore Lough (Wr. 30), showing mica-schist (*m*), limestone (*ls*), and pebbly deposit (*b*), under quartzite (*q*).

It is of interest to note that a garnetiferous zone occurs in the coarse gneiss, a short distance north of Binghamstown, near Belmullet. Its existence there, on a line with the limestone-zone east by south of Belmullet, on the shore, seems to indicate that the garnets are due to the absorption of the limestone in this locality by the great intrusive mass, which here strikes across Blacksod Bay. This coarse, pegmatitic gneiss is to be well seen in the vicinity of Binghamstown; and in

following it westward to the sea, and northward along the coast between Portnafrankanagh and Scotch Port Rock, its massive character is well observed, as well as the manner in which remnants of the dark-gray mica-schist—here almost absorbed—lie between thick bands, and are moulded over great lenticular hummocks of the intruded mass. Southward of the area of gneiss, the peninsula, as far as the newer gray granite of Termon Hill at Blacksod Point, is formed of knotted, silvery mica-schist, which seems to be the lowest portion of the metamorphic series, stratigraphically speaking, here to be seen.

Opposite this on the mainland, another important projection of quartzite from the Corslieve range occurs, at the outskirts of which, and separating it from the mica-schist area, runs the boundary in a zig-zag course, marked as usual with a band of limestone, which appears here and there through the almost continuous peat-covering. So continuous is the covering on the north side of the projection that the position of the boundary line can only be conjectured.

Passing another such, but smaller, projection from the range, we may cross to Achill Island, where the divisional zone between the two great groups is to be seen at four points.

A band of mica-schist strikes south-westward through Corraun-Achill, leaving high quartzite hills on the east in this peninsula, and a quartzite area on the north-west, fringed by limestone. It crosses Achill Sound, to be followed in a narrow valley to Ashleam Bay, near the southern extremity of the island. The mica-schist, which is dark-gray, and contains a graphitic seam and coarse sheared grit, dips south-eastward under quartzite, a pebbly band intervening; and on the north-west side of the bay the schist dips away from quartzite which forms the hill on that side, a pebble-bed here also intervening. There can be little question that the schist is the summit of an anticlinal fold, as shown in the accompanying section.



FIG. 6.—Section across valley near Ashleam Bay, showing quartzite (*q*) with pebbly grits on either side, micaceous and graphitic schists, and coarse dark-gray grit beds between: also mica-schist (*m*) faulted up against corresponding rocks south of the central hill.

The quartzite on the south-east side forms a ridge, to the south of which the mica-schists again appear, much dislocated and doubly

foliated, brought up probably by a vertical thrust which leaves on its north side, with the quartzite, dark-gray and black mica-schist, pebbly grit, and calcareous beds.

The quartzite group stretches away north-westward from Ashlem Bay, shown in section, to form almost the entire island. It becomes here and there distinctly micaceous and felspathic, and contains thin seams of mica-schist. It forms Dooga Hill (1530), and cliffs overlooking Keel Bay; Finsheen Hill (698), and Slievemore (2204) on each side of Doogort; and Croaghaun Hill (2192) rising up from the ocean, and overlooking Achill Head at the extreme west.

The mica-schist underlying the quartzite is to be seen in the Doogort Valley, the uppermost beds being here rendered visible by denudation. Limestone here also marks the divisional zone, and on the east side of Doogort Bay, which occupies the extremity of the valley, the dark-gray, almost black schist contains large, round blocks of granite, forming an excellent representative of the boulder-bed of Donegal, occurring, it will be remembered, as here, below the quartzite group.



FIG. 7.—Section across Doogort Bay, showing mica-schist (*m*) over-riding Slievemore quartzite (*q*), and overlain by limestone (*ls.*), boulder-deposit (*b*), and quartzite (*q'*).

The quartzite of Slievemore strikes obliquely toward Doogort Bay on the west side, with nearly vertical dip; but half a mile south of the village the quartzite joins that on the east side, a fault only, with probably a reverse throw intervening. Here, therefore, we have laid bare, by denudation, another instance of an anticlinal fold, though pushed westward along the thrust plane; for on the west side of the valley or bay neither the black schist, boulder-deposit, nor limestone band appears. The conditions seem to be as represented in the section here given. The boulder-deposit is represented in conglomeratic beds in Inishgaloon Island, opposite Keel, which are traceable along the coast east and west of Doogagh Bay towards Keem, where we again find the base of the great quartzite group.

One of the most interesting sections in the great metamorphic series is to be seen on the south-west side of Croaghaun Hill, near Achill Head. The promontory, known as the Head, is formed of gray, silvery, knotted mica-schist, similar to that already described as forming the Mullet, south of Binghamstown. This is followed in upward, direct, stratigraphical succession by one or two limestone bands which follow zig-zag courses, to be seen in the hollow striking north-westward from Keem to the steep-sided inlet known as Ooghnerillen.

Over the limestone and gray, silvery mica-schist associated therewith are black, gray, and dark-greenish micaceous and chloritic schists and a thick bed of coarse, pebbly grit. Following this thin group is a fine conglomerate with rounded pebbles of quartz, felspar pegmatite, and quartzite, introducing a great series of alternating grits and conglomerates which forms the hill-side near the cliff-edge, between the 1000 and 2000 feet levels, and cannot be much less than 1500 feet in thickness. The lowest grit beds of this series contain amethystine quartz, which is much sought after locally. Notwithstanding the great thickness of the conglomerate-grit series, the conglomerate thins out eastward to such an extent that at $2\frac{1}{2}$ miles distant it is represented by a single thin band of boulder-deposit, containing large, round blocks of light-gray, vitreous quartzite embedded in a matrix of very similar quartzite. The blocks range in size up to two feet by one foot three inches in sectional dimensions; and the deposit, which runs parallel to the road to Keem, and some 100 to 150 yards to the north of the road, is sufficiently peculiar to warrant this notice. If it were not on the strike of, and in proximity to, the great conglomerate series of the hill-side, it might be taken for a broken-up condition of the local quartzite, resulting from intense crushing, as in the case of the Howth quartzites, noticed by Professor Sollas. Three miles east of the cliff-edge, on the west side of Doogh Bay, near its entrance, conglomerate occurs at the base of the quartzite group, associated with chloritic and magnetite-bearing mica-schist, which also contains irregular masses of conglomerate; and around these latter the schist moulds itself, as the result of extreme pressure. These rocks correspond with those seen at Keem Bay, below the great grit-conglomerate series of Croaghaun Hill. The rapidity with which the series just mentioned thins out eastward is suggestive of the existence of ancient land to the west of Achill; but we cannot lose sight of the fact that prior to the deposition of the conglomerates was laid down a considerable thickness of

mudstones and limestones, which, at Achill Head at least, show no indications of a steep, shelving littoral. It may be that the boulder-deposit at the base of the quartzite group, though probably the result of glaciation in those far-off times,¹ marked the introduction of a great change of natural conditions resulting generally in the deposition of arenaceous materials throughout the north-west British area, and marked here in Achill by the grit-conglomerate deposit.

We seem to get further indications of not very distant land of the Dalradian epoch, in the massive bands of fine conglomerate which, in large part, form the small island Achill Beg, where, moreover, are to be seen gray and black mica-schist, some graphitic; and dolomite and steatite after limestone. The conglomerates contain pebbles of quartz, quartzite, and pegmatite; and both they and the mica-schist show evidence of contortion and over-folding, as well as of intense cleavage and shearing. This may be judged from the accompanying sketch, taken near the southern extremity of the island.



FIG. 8.—Contorted conglomerate bands in mica-schist.

Still another area of mica-schist, exposed in a hollow between quartzite hills, and fringed as usual by a limestone-bearing zone, is to be seen around Feeagh Lough, north-west of Newport. It is traversed by important basic igneous intrusions which do not here call for special notice. Here, again, we find interesting evidence for the succession of the groups—viz., mica-schist, an intermediate zone with limestone, and quartzite above, though at one point, west of the lake, the regular order of succession is reversed, as shown in the section, fig. 9, on p. 146.

We have thus seen that the persistence of a fairly well-defined zone throughout this tangled metamorphic series is the key to its true interpretation, preventing us attaching much weight to the present local dip and strike of the rocks, and enabling us to judge of

¹ As suggested by Mr. McHenry: Explan. Mem. of Sheets 3, 4, 5, 9, &c., pp. 17-50.

the modification which the original structure of the ground has undergone, through overwhelming earth-stresses operating laterally from the east and south-east of the area under review.

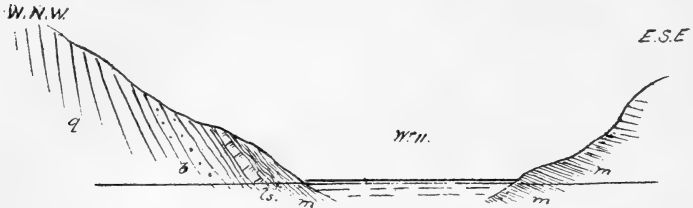


FIG. 9.—Section across Lough Feeagh (W.11) showing quartzite (*q*), pebbly beds (*b*), limestone (*ls*), and mica-schist (*m*)—natural order of succession inverted.

The structures described as manifest in North Mayo are but reproduced in North Galway. The quartzite of Maamturk Range and the Twelve Pins is the most striking feature of the area, and in general it dips northward, and under the mica-schist, cleaved grits, and limestone of the comparatively low ground skirting the range on the north. From our knowledge of the succession in Mayo, as well as judging from overfoldings which are to be observed in the valley slopes of the quartzite range, I have no hesitation in maintaining that the apparent order of the strata on the north side of the Twelve Pins is the converse of the original order of succession. This conclusion is confirmed by finding that the mica-schist and limestone series which underlies the quartzite, east and west of Letterfrack, is continuous with the series around Kylemore, to the north of and overlying the Twelve Pins quartzite.

The boulder-deposit is strikingly developed at Cleggan Hill, 7 miles west of Letterfrack, where it takes up a zig-zag course in the greenish-gray mica-schist beneath the quartzite which here forms the hill (481). The pebbles range up to 12 inches by 3 inches in section, and consist of quartz, quartzite, and a felspathic rock. In attempting to trace this deposit to the eastward it was found to be represented in a peculiar much-crushed band, half a mile north of the western end of Ballynakill Lough, where the pebbles are drawn out into long lath-shaped lenticles, embedded in a greenish-gray mica-schist. The condition of the deposit here may suggest a reason for its non-appearance further east for several miles; it may have been crushed out of recognition, as previously mentioned.

Below the boulder-deposit at Cleggan, limestone beds occupy a

well-defined hollow, partly filled by the waters of Cleggan Bay, and partly by Ballynakill Lough. The limestone crosses Barnabeg Bay, where it is seen to be identical with that forming bands, or one band repeated, which underlies the quartzite of Bengooria (1460) and Knockbrack (1460), the western spur of the Twelve Pins group. Following the limestone bands with their associated mica-schists north-westward, they are seen to pass beneath the important outlier of quartzite which rests in a synclinal hollow north of the large inlet, Ballynakill Harbour; and the mica-schist reappears on its north side. Passing from here, near Rinivyle, eastward toward Kylemore, we travel over the same series uninterruptedly; but south of Kylemore the earth-strains seem to have been much more violent than in the region last mentioned, producing overfolding on a great scale with the inversion already mentioned. In view of such effects, it is easy to surmise that in the frequently occurring outcrops of limestone to be seen on the ground eastward of Kylemore Lough one sees but repetitions of a few bands, possibly only one or two bands, by minor puckerings of the strata, as represented in section thus:—

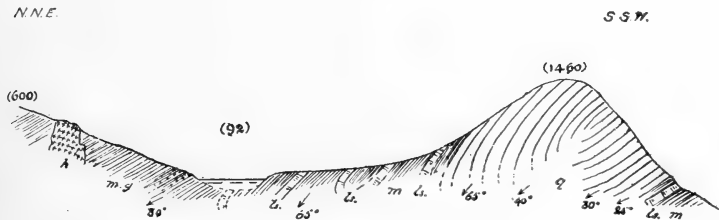


FIG. 10.—Section across Knockbrack (1460) and Kylemore Lough (92) showing micaceous grit (*mg*) penetrated by epidiorite (*h*) limestone bands (*ls*), and mica-schist (*m*) over-riding and underlying overfolded quartzite (*q*).

A similar section might be drawn near Maam, representing the relations of the two great groups of strata, with a limestone and schist series, near the quartzite, the present order of superposition being here also inverted; and particular attention is directed to beds of pebbly grit, perhaps represented, though meagrely, north of Kylemore Lake (see section), but which are to be well seen and traced through the region eastward toward Maam Bay, where they in part form the ridge bounding the Glenglosh valley on the north. They are again met with on the north side of the bay—a branch of Lough Corrib—and attain striking development about three miles east by

south of Maam Hotel, near the public road. These coarse, pebbly, or conglomeratic bands correspond in character and zonal place in the metamorphic series with the coarse, highly-altered grits and conglomerates at Westport and to the north of Castlebar.

The remarkable way in which the rocks of this area have been affected by earth-stresses is well illustrated by the manner in which a band of mica-schist, which does not appear to have been originally an igneous intrusion, has been thrust up into the quartzite ridge transversely to the prevailing strike, one and a half mile south of Pollnacappul Lough at Kylemore: the present foliation is parallel to the walls of quartzite on either side; and a further illustration is found in a peculiar occurrence of the boulder-deposit in Maam Gap. Here large, roundish boulders of reddish granite are enclosed in a greenish-gray highly micaceous grit, forming a mass resembling the boulder-deposit near Recess;¹ and it is here bounded east and west by the quartzite of the range, on the south by a granite which invades it and the quartzite, and on the north by gray mica-schist, which, though stratigraphically lower in the series, i.e., older, seems to have been pushed southward over it and over the quartzite. The boulder-deposit being here over-ridden by the mica-schist and limestone group, may suggest the reason for the non-appearance of the former where it might be expected along the north side of the range between the quartzite and mica-schist.

It may be noted that the overfolding "creep," attended with shearing and foliation of the rocks, was from the N.N.E. in this region—repeated, as we shall see later on, in post-Silurian times; while the creep was from the S.E. north of Clew Bay, and from the E.S.E. and south at Glencalry and Kilcommon.

In concluding this account of the Dalradian series of North Galway, reference should be made to important outcrops of igneous rocks which form in great part the rugged platform overlooking Kylemore on the north. Attention was called in the original Survey Memoirs and maps to the great mass of hornblende rock on the summit of the escarpment which terminates the platform; but invading this is a granite-gneiss, in parts quite coarsely crystalline, which is represented on the published maps as metamorphosed Lower Silurian strata, though on the 6-inch working maps it is justly described as fine and coarse gneiss. At the time this ground was being mapped the hypothesis prevailed that granitic gneisses mark the last stage but one

¹ Described in Appendix to 43rd Rep. Dept. Sci. and Art (1895), p. 36.

of transformation of sedimentary strata which culminated in granite. Hence the indication used for these metamorphic rocks upon the map. A section which I observed in Leckvarna, south of Lough Fee, and west of the main road from Leenane to Kylemore, proves, as do other such sections north of Kylemore Castle, where the two igneous rocks adjoin, that the granite intrusion is the later.

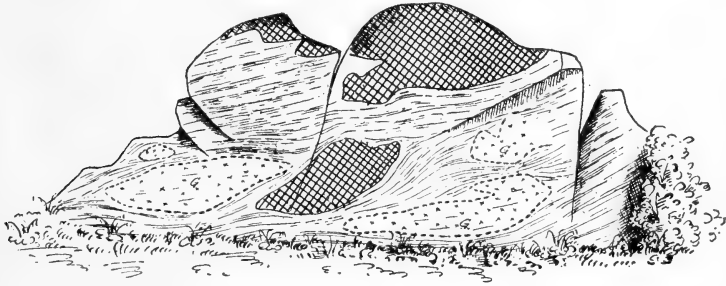


FIG. 11.—View in Leckvarna, of Hornblende Rock (cross-hatched), invaded by granitic mass chiefly gneiss, containing unshattered eyes of granite (G).

The granitic rock dovetails into mica-schist westward in Lettergesh, contains masses of serpentine (probably) after partially absorbed areas of basic rock, and is itself in places highly sheared, so as to be indistinguishable from mica-schist of sedimentary origin; and where it invades the great basic outcrop north of Kylemore, it takes up a foliated arrangement of its constituents—probably fluxion-structure—around the prominences of the older rock. This is well to be seen in the small gap between Lough Aceragh and Lough Touthier, and the granitic rock occupies a considerable area from this locality northward to the Silurian boundary, where it margins the newer formation for $3\frac{1}{2}$ miles.

Another interesting igneous tract adjacent to the Silurian strata, of older date and probably of the same age as that just described, is to be seen on the north side of the inlet of Lough Mask, west of Clonbur, and forming one or two islets near the western end of the inlet. It contains detached pieces of hornblendic and metamorphic rocks, as in the case of the granitic rock near Kylemore. These igneous intrusions mark a zone of irruption, with probable disturbance, margining the ancient sea in which the Silurian strata were deposited. The existence of such a zone accounts for an important interruption in the succession, in Llandovery times, seen on the south

side of the basin, with deposition of Wenlock strata against a denuded shelving shore of sinking land, while a conformable sequence from the Lower to the Upper Silurian series exists, in the centre of the basin, near Doolough.

SILURIAN ROCKS.

It has long been known that, as just stated, a conformable passage is traceable from Lower Silurian grits and slates, with double graptolites at Doolough, to Upper Silurian beds 3 miles north-west of this lake. At Cregganbaun here, that is, about 5 miles south of Louisburgh, occurs an earthy arenaceous limestone, but slightly cleaved, which contains a wealthy Upper Silurian fauna. Amongst the fossils occur *Pentamerus Knightii* and *P. oblongus*; and although the beds are represented as *Llandovery* on the published map, it is stated in the Geological Survey Memoir¹ that the rocks "are highly charged with fossils of an Upper Silurian, *probably Wenlock, character*, consisting mostly of corals and Brachiopod shells." They are taken here to be of Wenlock Age. About a mile and a half west by north of this locality monoproniid graptolites have been found in Derrygarve Slate Quarry, where the rock is probably of Tarannan Age.

Above the earthy limestones at Cregganbaun follows a series of green argillaceous grits, which spreads out through the wide area extending northward to Louisburgh; and below the limestone zone occurs a thin band of quartzite, at the base of which is found a notable quartzose conglomerate, with large, rounded blocks and pebbles of quartzite, which overlies the *Monograptus* slate.

The thin quartzite band and associated conglomerate are traceable north-eastward by Corvoekbrack (1287), and Knockaskeheen (1288), and thence eastward by Knockfadda (957). That here we have the Cregganbaun group is rendered the more certain by the occurrence of earthy limestone and calcareous grit with identical fossils, adjacent to the quartzite at Boheh, south of Croaghpatrick. The limestone passes into a sericite schist at Knockfadda, the fossils being obliterated, and it retains this deformed character eastward while traceable in its usual place above the quartzite and conglomerate zone towards Oughty hill (1104). Here the quartzite becomes a gray grit, and further east it ceases to be recognizable, though its place is indicated

¹ Explanation of Sheets 83 and 84, p. 32.

as associated with the conglomerate, which may be followed much further east.

Before passing from this locality it may here be stated that on the original 6-inch maps it has been noted that the "conglomerate containing large, rounded pebbles of quartzite [is] similar to that at Croaghpatrick." The significance of this observation will appear later on. It may also here be stated that in a small area at Knockfadda the beds, some of which are highly calcareous, are transformed into mica-schist; with this exception, and that of some margining the Corvockbrack granite, the slates and grits of the area have not reached the degree of transformation which justifies other naming than sericite-schists, or phyllites, though in few places have the rocks escaped considerable cleavage.

Passing eastward to the borders of Lough Mask, the Cregganbaun group is represented by calcareous beds, with a corresponding fauna south of Toormakeady. The fossils may be collected at several points in the Kilbride peninsula, and west of Cong,¹ in calcareous strata overlying gray grit mottled with red, and containing annelid burrows (pipe-rock), which may be traced southward, across an arm of Lough Mask, through Kilbride and along the top of Bencorragh, south of Lough Nafaoey. Here the fossil-bearing greenish calcareous grit is also found overlying the annelid grit, which on being traced still westward passes into purple grit and red slate. There is, therefore, little doubt that here we have still represented the Cregganbaun group, but under circumstances entirely different from those at this latter point, as I now proceed to show.

It will be noticed on the 1-inch published maps, which are summarized upon the one accompanying this paper, that the pipe-rock and overlying fossil-bearing calcareous beds dip eastward and southward from conglomerates, grits, and felsites of (?) Bala Age. Indeed, the felsites at Toormakeady follow directly upon black slate, in which I collected graptolites of Lower Llandeilo or Arenig Age, about a mile north of the hamlet;² so that volcanic activity may have commenced earlier than Bala times in this district, though doubtless continued while limestones of this age were being formed.³ This view

¹ Explanatory Memoirs of Sheets 85 and 95, p. 15.

² Ancient Volcanoes of Great Britain, by Sir A. Geikie, D.C.L., LL.D., F.R.S., vol. i., p. 49.

³ In the Toormakeady complex I noticed some felsites and ash-like igneous breccias which, as intrusions into rocks adjoining them probably carried the

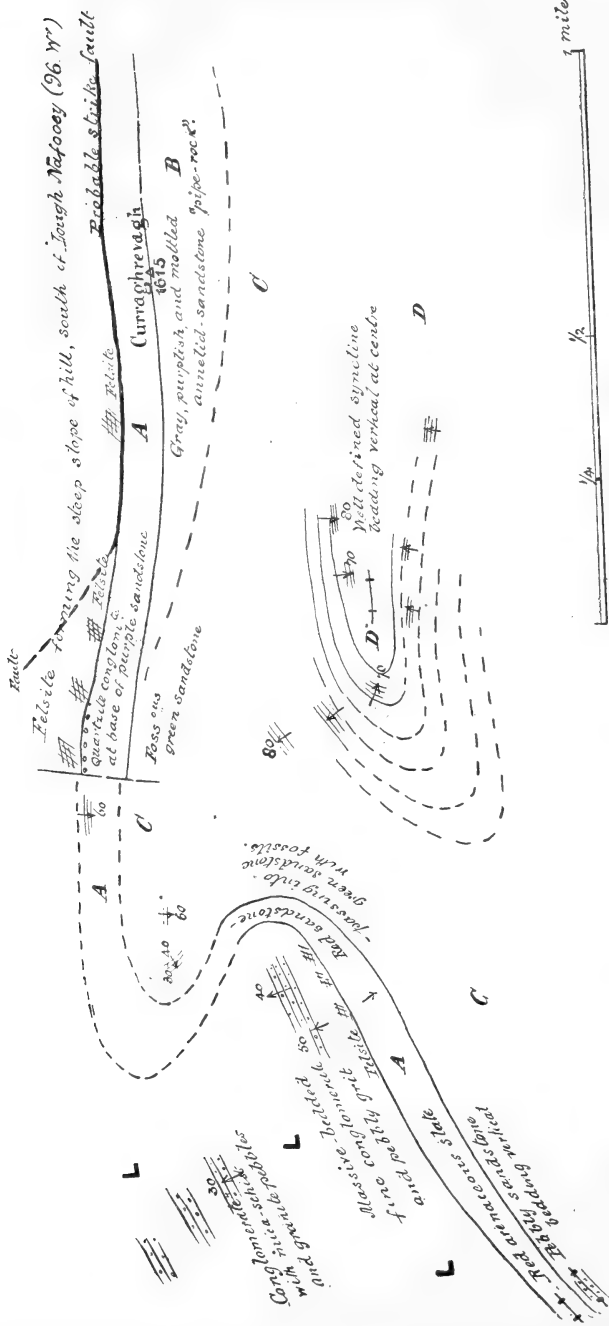


FIG. 12.

is consistent with the fact that the Curraghrevagh lava and associated conglomerate seem to dip under the limestone band which occurs at the west end of Lough Nafuoey. The lavas of the hill just mentioned and of Bencorragh may therefore represent lower horizons than Bala; and the same may be said of some of the associated conglomerates here, as at Leenane, which will hereafter be described. That they are not of later date is fairly certain; yet the representatives of the Cregganbaun group south of Tourmakeady in Kilbride and at Bencorragh, rest against the lavas mentioned and their associated conglomerates. The geology of this locality is so important that a reduced view of the working 6-inch map is here given. It will be noticed that the *newer* rocks are here in places set vertically, which may be borne in mind in view of overfoldings which must be referred to later.

That a strong unconformability occurred, probably in Llandovery times, which involved the denudation of strata belonging to this age, and much of the Lower Silurian series, where Wenlock strata now exist, cannot therefore be questioned. In consequence of the denudation, the floor of this group seems to consist for the most part of metamorphic rocks of Dalradian age rather than of Lower Silurian strata. Thus, representatives of the Cregganbaun group are to be met with along the southern margin, resting directly upon metamorphic grits and mica-schist; and, towards Maam, the fossil-bearing zone appears at several points, accompanied in the valley south-east of Leenane by conglomerate, which is distinguished, as at Cregganbaun, Knockfadda, and several other points, by being made up chiefly if not entirely of well-rounded pebbles and blocks of quartzite. This conglomerate is traceable across the rugged tract westward, growing in importance towards the sea-coast in its course by Lough Fee and Garraun Hill.

A section drawn northward a short distance west of Leenane traverses an ascending series of Wenlock and Ludlow strata in regular sequence, not Llandovery, followed by Ludlow, as was formerly supposed; and beyond the Ludlow outcrop of some 1,200 yards in width is encountered one of the greatest dislocations, if not quite the greatest, in this much-faulted area. It is probably

volcanic activity to a somewhat later date. The same may be said with regard to some agglomerate-like breccias which I noticed in the Kilbride igneous tract. See Paper on similar masses in S.-E. Ireland, by A. McHenry, M.R.I.A., and J. R. Kilroe, *Jour. Geo. Soc.*, vol. lvii., p. 479; and the recently issued Memoir of the Limerick District, pp. 33 *et seq.*

an upthrust from the north, bringing Llandeilo and Arenig strata to a level with—indeed slightly higher than—the highest beds of the Ludlow which are to be observed in the region.¹ On the north side of this break, about half a mile west of Bencraff (1822), a stream lays open a section through fine gray conglomerate and sandstone, black slate and chert, and a sill or dyke of felsite, where it tumbles from the older rocks over the Ludlow band southward. The black slate and chert here yielded me graptolites, by means of which² the beds were proved to be of Lower Llandeilo or Arenig Age. The series, including the sandstones and conglomerates above, presents an unbroken sequence; and no reason can be adduced, so far as our knowledge extends, against considering the rocks around Derrynasluggan and eastward towards Leenane on the south side of Killary Harbour, older than Bala. That they are of Llandeilo age is rendered the more probable by the circumstances of rocks which occupy a similar position relatively to the Ludlow, at Salrock.

The great line of break is traceable westward to this latter place, dipping into the Harbour, so as to leave Ludlow strata forming the shore between Derrynasluggan and Salrock “pass.” Here, massive sandstone beds dip away from the line of break; and with fine and very coarse conglomerates, form the peninsula between the Harbour and Little Killary. Llandeilo fossils have been found on the north and south sides of this promontory.³ Those on the north side have been described as determinative of Lower Llandeilo;⁴ and, the dip of the beds being northward, the fossils on the south side must belong to a much lower zone, unless the beds be inverted (see foot-note). That they are inverted would seem to be probable from the fact that portions of a limestone band and calcareous breccia (such as elsewhere is met with in association with the igneous series) are to be seen at each end of Salrock “pass,” that is, near the line of break. These cir-

¹ It should be noted, in view of the vast denudation preceding the deposition of Wenlock beds, as explained on p. 153, which exposed Llandeilo and Arenig strata in the floor upon which the Wenlock beds were subsequently laid down, that the Salrock-Bencraff fault may be of no greater throw than just sufficient to cut out the Wenlock group and portion of the Ludlow. This, however, would still leave the break of considerable magnitude.

² As determined in 1894 at the Geological Survey Office in London.

³ Mr. McHenry informs me that the fossils (graptolites) on the south side are indicative of Upper Llandeilo, while those on the north side are Lower. This being the case, the order of the beds is inverted, as they dip northerly.

⁴ Explanation of Sheets 83-84, p. 28.

cumstances suggest either the inversion mentioned, or that the limestone is much older than Bala, or yet again that the limestone has been caught in the break between two plains which sever it from the Llandeilo grits on the north, as well as from the Ludlow rocks on the south. In any case it is obvious that on the south side of Killary Harbour occur considerable areas of Llandeilo strata.

On the north side of the harbour, an ascending series of coarse grits and conglomerates, with intercalated bands of green shales forms the imposing hill Mweelrea, upon the south flank of which, at a short distance above Bunnaglass, were collected fossils believed, even when the ground was mapped, to be indicative of Caradoc strata.¹ At some five points at the foot of the hill, on its west side in Oggool, was found a somewhat abundant fauna, also indicative of Caradoc rocks; and on the north side below the summit, west and north of Lough Bellawaum, Caradoc forms² were also collected, while on the east side of the same small lake fossils were found believed to be determinative of Llandovery strata.³ Here, therefore, a boundary was drawn between

¹ Explanatory Memoir of Sheets 83 and 84, p. 28. The fossils reported from near Bunnaglass were:—

<i>Leptæna sericea.</i>	<i>O. testudinaria.</i>
<i>Orthis calligramma.</i>	<i>Bellerophon trilobatus.</i>

Those given from the west foot of Mweelrea included the above-mentioned, together with—

<i>Lingula ovata.</i>	<i>Ecculiomphalus Bucklandi.</i>
<i>Murchisonia trochiformis.</i>	<i>Theca revessa.</i>
<i>M. sp. indet.</i>	<i>T. triangularis.</i>
<i>Platyschisma helicites.</i>	<i>Orthoceras ibex.</i>
<i>Raphistoma elliptica.</i>	<i>O. subundulatum.</i>
<i>R. sp. indet.</i>	<i>Asaphus radiatus.</i>
<i>Bellerophon bilobatus.</i>	<i>A. sp. indet.</i>
<i>B. trilobatus.</i>	

² Those named in the Memoir are:—

<i>Leptæna sericea.</i>	<i>Ctenodonta transversa.</i>
<i>Lingula ovata.</i>	<i>Bellerophon bilobatus.</i>
<i>Orthis biforata.</i>	<i>B. trilobatus.</i>
<i>O. testudinaria.</i>	<i>Orthoceras ibex.</i>
<i>O. (?) vespertili.</i>	<i>Asaphus radiatus.</i>
<i>Porambonites intercedens.</i>	

³ Explan. Mem. Sheets 83 and 84, pp. 28-30. Some of the above species were obtained at the point east of Lough Bellawaum. Those not reported from the other localities were:—

<i>Orthis elegantula.</i>	<i>Orthoceras tenuicinctum.</i>
<i>Pentamerus galeatus.</i>	<i>Phacops sp. indet.</i>
<i>Holopella cancellata.</i>	<i>Proetus latifrons.</i>

the two members—really between the Upper and Lower Silurian, here quite conformable. The stratification in the region to the eastward is so regular and well shown that an approximate continuation of the boundary was drawn as represented on the present map.

Age and Structure of Croagh Patrick.

Perhaps the most interesting result of revision-work in the West of Ireland was the establishment of the age of Croagh Patrick range to be Wenlock, though consisting of rocks which present a high degree of metamorphism, so much so that they were originally classed with the quartzite and associated schists of Nephin and Connemara. Generally speaking, the crest of the ridge, including the conical peak, and a large proportion of the northern slope, consists of quartzite; while the south flank shows crumpled schists dipping northward *into* the hill and beneath the quartzite. These schists are for the most part sericitic, but near the foot of the escarpment are distinctly micaceous, the result of processes in which dynamical agency operated strongly. It has already been mentioned that evidences of contact metamorphism are apparent in the schists bordering the granite intrusion of Corvockbrack; and it is interesting to find illustrations of two types of metamorphism in such close proximity.¹ With the exception of these cases, mineralization is not manifest throughout the Silurian area, though cleavage prevails in the region northward of Killary Harbour and the Erriff valley.²

The intense dynamical metamorphism manifest along the south flank and foot of Croagh Patrick has accompanied overfolding on a vast scale, which has supplied the key to the structure of the range. It is also, indeed, traversed by oblique cross-faults, which, however, are of comparatively minor importance. The conclusions as to overfolding, and as to its post-Wenlock age, find confirmation in the sharply-folded condition of the unaltered Wenlock rocks, containing recognizable fossils south of Lough Nafuoey, represented in the sketch map on p. 152. We are not, however, dependent upon inference for conclusions regarding Croagh Patrick; for, happily, the overfolding of the rocks which form the range leaves their original order of sequence intact, though inverted, as I now proceed to show.

Along the north flank of the range for 7 miles, from Kilgeever

¹ As mentioned in the Summary of Progress of Work in Ireland for 1893.

² The micaceous schist above mentioned may conceal a not deeply buried core of granite.

Hill, near Louisburgh, to Belclare, south-west of Westport, may be seen at intervals, always in the same position relatively to the quartzite, massive conglomerates containing almost exclusively pebbles of banded quartzite, of all sizes up to 3 feet in length by 15 to 18 inches across, crushed, compacted together, and elongated by compression in a very remarkable way, and set in a highly-silicified matrix. On a previous page a note was cited from the 6-inch working field-map (made by the original surveyor, who was quite unaware of conclusions such as the present with regard to the range) to the effect that the conglomerate here described resembles that at Knockfadda; which, it will be remembered, underlies quartzite, as is the case with stratigraphically corresponding beds at Cregganbaun.

If a section be taken along the stream which drains the hill, and flows north by Leckanvy R. C. chapel, the conglomerate, about 70 feet in thickness, appears with the commencement of the steeper slope above the drift-covering; and it rests upon quartzite which forms a downward series, while the stream flows northward. The series dips at a high angle, must be of considerable thickness, and, striking south-eastward, it is seen to form the peak of Croagh Patrick.

The stream before turning northward flowed north-westerly upon a band of calcareous slate and sandstone, which are considerably cleaved, generally in accordance with the bedding, but not mineralized. The original characters of the beds are so well preserved, notwithstanding cleavage, that little difficulty is experienced in recognizing in them, on lithological grounds, the counterparts of those already described which yielded fossils at Boheh similar to those at Cregganbaun. This conclusion was verified by the discovery in 1893 of a turbinated coral, of a type plentiful at Cregganbaun. Two recent visits to the ground, the second in company with the present Director of the Survey, have resulted in further unquestionable confirmation, when seams of calcareous argillaceous sandstone came to light, bearing a rich fauna of corals (*Petraia*, *Favosites*, &c.), graptolites, and trilobites. The forms of the latter two groups are just recognizable, but scarcely sufficiently so to warrant naming.

The beds containing these fossils dip beneath the quartzite of Croagh Patrick peak, just as the continuation of this, in the Lecanvy stream, dips beneath the conglomerate; and from what has been explained above, there is no longer any room for question that this important portion of the range is made up of the three members of the Cregganbaun group, though in inverse order of occurrence.

The fossil-bearing beds, shown as mica-schist on the published map, are there represented as faulted against quartzite on the south side,

which forms the important mass of Leckanvy Hill, rising to 1849 feet. Judging from the form of the ground, a dislocation along the direction of strike has probably occurred. The conditions accountable for the structure of the range would seem to point to an upthrust from the north along this line; but other considerations rather favour the view of direct faulting with downthrow on that side. In any case there seems to be a repetition of the peak quartzite in Leckanvy Hill, otherwise there would be an excessive thickness of this rock intervening between the sericite schist of the south flank here and the conglomerate on the north side, compared to the narrow outcrop and small thickness of the same member which separates the sericite schist and conglomerate, only two miles to the west in Kilgeever Hill. As before explained, the sericite schist along the south flank of the range is identical in character with that at Knockfadda; in both places it is highly sheared, is calcareous, and shows pittings on the weathered surfaces of its thinly laminated, often puckered, and in places mica-cised folia; and its relations to the quartzite, below it at Knockfadda, though above it by inversion at Croagh Patrick, show conclusively that we are dealing with the same member of the Wenlock group. In Croagh Patrick on the north, and in Knockfadda, Boheh, and Cregganbaun on the south, we therefore have opposite limbs of a synclinal trough, filled in the intermediate ground with argillaceous, green, fine-grained grit of remarkable uniformity in character, which hitherto has not yielded any fossils. The accompanying section across the range through the fossil locality may be taken to represent the structure of the range.¹

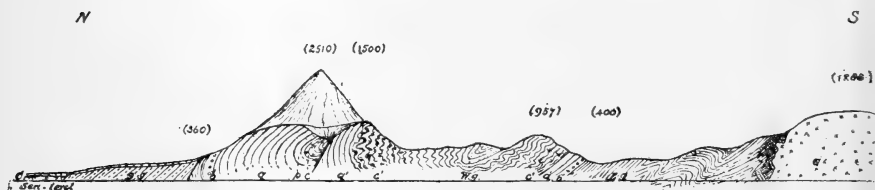


FIG. 13.—Section, from Clew Bay southward, across Leckanvy Hill (1500), Knockfadda (957), and Knockaskeheen (1288), showing Croagh Patrick (2510) to the east; Drift upon Carboniferous limestone (*d*), and metamorphosed grits (*g*)—the latter thrust over mica-schist and quartzose conglomerate (*b*); also quartzite (*q*), pebble-beds (*p*), and fossil-bearing calcareous arenaceous mudstone (*e*) faulted down against quartzite (*q'*); metamorphosed calcareous beds (*c*), green grits (*W.g.*), quartzose conglomerate (*b'*), greenish gray grits (*L.g.*), and granite (*G*).

¹ If, as there is good reason to think, the rocks at Old Head be Old Red Sandstone,

While the rocks of Croagh Patrick were believed to be of the same group and general age as those at Westport and north of the Clew Bay, it was easy to dismiss the question of differences in lithological characters between the highly metamorphosed grits and black slate, seen south-east of the town—the counterparts of those north-west of Castlebar—and the rocks forming the range. The question, however, towards the close of the somewhat hurried revision, was perceived to be of so important a nature, involving the age of the great metamorphic series, that it was allowed to lie outstanding until it could be satisfactorily decided. It presents the following features, viz. :—

1. The great conglomerate of Croagh Patrick is not traceable further eastward than Belclare, three miles from Westport, on the south-west, where it appears in striking development.

2. The quartzite of the range may be followed eastward almost to the Carboniferous boundary, a mile and a half south-east of the town, where it vanishes.

3. The sericite schist on the south of the range seems continuous around the end, with the similiar silky phyllites which skirt the quartzite on its south side here, as far perhaps as Belclare, where much broken ground suggests a transverse dislocation of the strata.

4. The *green* argillaceous grits at Belclare have the aspect of Wenlock strata rather than that of the *greenish-gray* grits associated with the coarse conglomeratic grits and black slate at Westport, and along the shore by Leckanvy beyond Murrisk.

5. A distinct line may be approximately traced upon the ground between the silky phyllites and green grits, above mentioned, and the coarse grits and black slate near Westport; and this line seems continuable westward to separate the rocks of the ridge from those nearer to the sea at its foot, though the persistent band of serpentine which invades the two sets of rocks greatly obscures the geological

following in apparently unbroken succession upward those along the coast north-west of Louisburgh, which, in my opinion, are of Ludlow Age, then it is probable that the overfolding and metamorphism of the rocks at Croagh Patrick took place in Old Red Sandstone times. A provisional boundary is drawn on the map between the Old Head rocks, which are largely conglomeratic, and those south-westward of that point, which consist of red shale and shaley sandstone.

details by means of which such a line could be established or disproved south of Murrisk.

6. While recognizing that the existence of the Croagh Patrick conglomerate, considerably more important here than at Cregganbaun, and containing larger blocks, suggests littoral or approximately basal conditions, just as the corresponding deposit does at Lough Fee, near Kylemore, yet the strike of the Wenlock beds at Leckanvy and certain other points in the region, suggests that during the overfolding, best seen in the newer rocks, a slip or overthrust took place, generally speaking, where the two sets of rocks adjoin. Such a break, whether stratigraphical or mechanical, would greatly obscure the relations between the Dalradian and the Silurian rocks, as well as the evidence for the age of the former in this region.

7. What rocks formed that ancient sea-floor, and the adjoining land which furnished the quartzite conglomerate, is, perhaps, one of the most debated points in the geology of the British Isles. The discovery that the Wenlock beds were deposited upon upturned Llandeilo strata at Lough Nafuoey, in virtue of an interruption in the Silurian succession, of Llandovery date, leaves inquirers still free to surmise the existence of Lower Silurian strata in the great metamorphic series of North Mayo, Galway, and Donegal. The correspondence in character between the Westport grits and black slate and the rocks along the Leckanvy shore, in which the collector may indulge the most sanguine hopes of finding graptolites, and those of the northern part of Clare Island, which, on the published map, are represented as unaltered Lower Silurian strata, may well be supposed corroborative of the surmise. It is further encouraged by the succession from black slate, through limestone and a boulder deposit, to quartzite, as seen, say, at Achill and Donegal, which well corresponds to the Lower Silurian succession from Llandeilo through Bala to overlying conglomerate, or boulder-beds and grits, seen in the south-east of Ireland. Even the apparent inversion of Llandeilo rocks at Rossroe, which would be indicative of a region of overfolding and overthrust, saving the rocks above from the metamorphism which affected so strongly those below the thrust-plane—possibly of corresponding age—might also be supposed to lend colour to the supposition. What is looked for, however, is definite fossil evidence; and until this is forthcoming the age of the great metamorphic series cannot be regarded as a settled question.



INDEX

d ²	Lower Carboniferous Limestone.		Quartzite.
d ¹	Lower Carboniferous Sandstone and Shale		Boulder-deposit, Limestone, Graphitic & Mica-Schist.
cd	Basal beds of Carboniferous Sandstone (or upper Old Red Sandstone).		Mica-Schist, with beds of fine Conglomerate
C	Lower Old Red Sandstone.		Granite, non-foliated.
			Granite, foliated, in Metamorphic Series. Hornblende-rock and Epidiorite.

Scale — 0 3 6 9 12 15 18 MILES.

KILROE.—ROCKS OF MAYO AND NORTH GALWAY.





KILROF.—ROCKS OF MAYO AND NORTH GALWAY.



PROCEEDINGS
OF THE
ROYAL IRISH ACADEMY

VOLUME XXVI

SECTION C.—ARCHÆOLOGY, LINGUISTIC, AND
LITERATURE



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CONTENTS

SECTION C.—ARCHÆOLOGY, LINGUISTIC, AND LITERATURE

	PAGE
ARMSTRONG, (EDMUND CLARENCE RICHARD), M.R.I.A. :—	
Stone Chalice, so called. (Plate XXI.),	318
ATKINSON (ROBERT), LL.D., M.R.I.A. :—	
On the Function of an Academy, in especial of the Royal Irish Academy,	44
COFFEY (GEORGE), M.R.I.A. :—	
Early Iron Sword found in Ireland,	42
Craigyarren Crannog, excavated by W. J. Knowles and George Coffey. (Plates V.—X.),	109
Two Finds of Late Bronze Age Objects. (Plates XI., XII.),	119
COOKE (JOHN), M.A., M.R.I.A. :—	
Antiquarian Remains in the Beaufort District, County Kerry. (Plates I.—IV.),	1
ESPOSITO (MARIO) :—	
An Unpublished Astronomical Treatise by the Irish Monk Dicuil. (Plate XXII.),	378
FALKNER (CESAR LITTON), M.A., M.R.I.A. :—	
Barnaby Rich's "Remembrances of the State of Ireland, 1612," with notices of other Manuscript Reports, by the same writer, on Ireland under James the First,	125
The Hospital of St. John of Jerusalem in Ireland,	275

	PAGE
Gwynn (Edward), M.A., F.T.C.D., M.R.I.A. :—	
The Manuscript known as the Liber Flavus Fergusiorum,	15
Knox (Hubert T.) :—	
Notes on Gig-mills and Drying-kilns near Ballyhaunis, County Mayo. (Plates XIX., XX.),	265
Westropp (Thomas Johnson), M.A., M.R.I.A. :—	
The Ancient Castles of the County of Limerick (North-Eastern Baronies),	55
The Ancient Castles of the County of Limerick (Central and South-Eastern Baronies). (Plates XIII.—XV.),	143
The Ancient Castles of the County of Limerick (Western Baronies). (Plates XVI.—XVIII.),	201
The Cists, Dolmens, and Pillars of the Western half of the County of Clare. (Plates XXIII.—XXV.),	447
Wood (Herbert), M.A., M.R.I.A. :—	
The Templars in Ireland,	327

ERRATA.

SECTION C.

- Page 16, line 16, for "1435" read "1437".
- „ 16, „ 18, for "1440" read "1446".
- „ 18, last line, for "Consattin Pol" read "Consattinphol".
- „ 19, line 4, for "an nathur" read "ann athur".
- „ 19, „ 6 from bottom, *dele* "and appears to be incomplete. Ends".
- „ 21, „ 17, for "the second" read "one".
- „ 24, „ 9, for "fedarum" read "fed a ruin".
- „ 27, „ 20, for "Iudhisdin" read "Uidhisdin" (i.e. Augustine).
- „ 28, „ 6 from bottom, for "certain" read "the penitential".
- „ 29, „ 4 from bottom, for "1440" read "1446".
- „ 33, „ 16, for "IS he" read "Isu".
- „ 36, „ 13, for "neimte" read "neimhe".
- „ 36, last line, for "he" read "he[cairse]".
- „ 69, „ 14, for "son of Prince Teige" read "son of Prince Conor, who had abdicated in favour of Teige na Glemore O'Brien".
So also on p. 144, No. 106.
- „ 148 (section 119), for "Lesnernamadda" read "Lesuanermadda", i.e. Lisdermot mervol.
- „ 190, note 2, for "Clapat Street" read "Blapat (Blossoms) Street".
- „ 220, note, for "Hollypark" read "Hollywood".
- „ 369, Under *Clonaul, Manor of*, for "Kilmacloy (? Kilmoyler)" read "Kilmacloy (Cooleundry)".
- „ 382, line 17, for "lunari¹" read "lunari(1)".
- „ 450, 4 lines from end, for "Berneens" read "Baur".
- „ 455, 7 lines from end, for "tongue" read "thumb".
- „ 462, section 45, for "3½ feet" read "83 feet"; for "vol. xxx" read "vol. xxxv".

PROCEEDINGS

OF

THE ROYAL IRISH ACADEMY

PAPERS READ BEFORE THE ACADEMY.

I.

ANTIQUARIAN REMAINS IN THE BEAUFORT DISTRICT,
COUNTY KERRY.

BY JOHN COOKE, M.A.

[PLATES I.-IV.]

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IN the country lying immediately beyond the Reeks to the north and west, little or no archæological research has hitherto been made. The cave of Dunloe, the Kilcoolaght and Kilbonane ogams have long been known; but no one has, I believe, investigated the raths and rath-chambers that lie dotted over a very extensive area in this portion of the kingdom of Kerry. Through the kindness of Dr. Cecil Digby, of Beaufort, and under his able guidance, and with his very ready help, I was enabled to make some examination of these and other remains in the summer of this year. Owing to Dr. Digby's thorough knowledge of the district and its people, my investigations were made without any difficulty; and every opportunity was given me by the occupiers of the land to traverse and explore where I pleased. To him and them my especial thanks are due for the help and facilities afforded me.

The ridge of high ground on the north side of the Laune river beyond Beaufort, and the extensive plain, dotted with hills extending

southward to the foot of the Reeks, are studded with raths, as a glance at the Ordnance maps will show. The existence of the Dunloe cave, well known to archæologists through its ogams, was an indication to me that underground chambers probably existed elsewhere in the district.

TULLIG (O. S. 65¹).—Hearing of a collapsed chamber, into which a horse fell at Tullig, on the farm of a man named Shea, about half a mile beyond Churchtown, on the right of the road to Killorglin, I paid a visit to the spot, and had the chamber cleared out at considerable labour for examination. The field is on a gentle elevation, and probably once possessed a rath; but there is no sign of it now, and it was probably levelled during tillage operations, and the division of the land into fields. The chamber and passages were cut in the native earth, the strata being of a close and compact clayey nature, and no stones whatever were used in their formation (Plate I.). The main chamber, which had completely fallen in, being cleared out, showed that it measured 7 feet by 4 feet 10 inches wide, it was about 5 feet high, the roof being about 7 feet from the surface of the ground. It lay nearly north-west by south-east; and from near the south end a narrow passage, 18 inches high and over 2 feet long, led with a wide sweep on the right into another chamber 12 feet long, 5½ feet wide, and 5 feet high. From this chamber another passage—5 feet long, 19 inches wide, and the same height—led into another chamber, with a wide curve on the right and running nearly east and west; it measured about 4 feet wide and sloped upwards, but was quite choked at a distance of 6 feet. This was no doubt the passage from the original entrance from above, but I did not get it cleared further. I was doubtful how far the passage ran, nor did I like the look of the damp, moist roof; and as much labour had already been expended, and other matters pressing on my attention, I abandoned further search along the passage.

FOGARTY'S RATH AND CHAMBERS, CULLENAGH UPPER (O. S. 65).—This is a fine rath, lying south-west of Cullenagh national school, in the land of a farmer named Fogarty. It is in fairly perfect preservation, and circular, with an interior diameter of 76 feet. It is surrounded by a stone and earthen rampart 11 feet thick, and 8 feet high in places, on which furze and thorn bushes grow luxuriantly. I was told that an opening to a chamber had been discovered some years ago, and this, on experimenting, was found near the centre of the rath (Plate II.). The removal of earth and stones to a depth of a few feet disclosed a passage,

¹ The references are to the Six-inch Ordnance Map of Co. Kerry.

with an entrance 1 foot 10 inches wide at top, and 2 feet 10 inches at bottom, and 2 feet 8 inches high. Within this the structure formed a passage-chamber 16 feet long, and 3 feet wide at entrance, which increases at 12 feet to a width of 4 feet. The walls are built of ordinary flat field stones, slightly curving and supporting a roof formed of eight covering stones, several of which overlap. The floor is strewn with a large quantity of loose stones, and it slopes downwards to the west end, where it is $3\frac{1}{2}$ feet high. Here a narrow passage exists, which is completely blocked up; it is but 22 inches wide, and lies at the north-west corner. The entrance also showed another passage to the south, also choked, and which it was not possible for us, under the then circumstances, to explore further. Various legends are told of the rath, one of a boy servant who, bringing the cows home one evening at dusk, found his way into the souterrain. Here he saw the usual assembly, and describing them afterwards to the farmer whom he served, the man admitted that one of them was his own father, the boy's particulars being so graphic that the old man with several children were easily recognised as among the fairy residents of the rath-chamber.

ARDRAW RATH (O.S. 57).—This rath lies about four miles from Beaufort, on the right of the main road to Killorglin, in the farm of William Joy. It is in a commanding situation, with a magnificent view of the Reeks. The rath is finely planted with trees, and is a very conspicuous object from the surrounding country. It has double ramparts, separated by a deep trench. The space within the inner rampart is 80 feet in diameter, and is, practically, a perfect circle. The thickness of the sloping, inner rampart is about 20 feet, and its height, from the bottom of the trench, varies from 12 feet to 17 feet. The breadth of the trench, from the top of the outer to the top of the inner rampart, is 42 feet. The ramparts are built of clay and loose shale. From its elevated position, and the strength of the ramparts, the rath must have been an important one, and easy of defence. The inner rampart is slightly defaced, on the south side, by a searcher for an underground passage, some twenty years ago. Last year a portion of the inner rampart collapsed, at the west side, the roof having evidently been loosened by the roots of a tree. The fall disclosed a great opening, partly filled with loose earth; from this opening two passages run westward, separated by a couple of feet, and ending in the rampart wall. The true passage ran, no doubt, to the east, to the real opening within the rath; but the search I made within the fallen chamber, rendered difficult from the condition and

nature of the material, did not reveal it. The depth, from the surface to the roof of the chamber, is $5\frac{1}{2}$ feet. The width of the exposed entrance is 5 feet, and, at 5 feet inwards, it increases to 6 feet, and gradually narrows to a couple of feet at the extreme end. The floor of the fallen-in portion is covered with several tons of earth, but at 5 feet inwards it is 5 feet high, and the roof gradually lowers to $2\frac{1}{2}$ feet at 1 foot from the extreme end. The total length is 12 feet. The other passage is 4 feet wide and 4 feet long, and is also full of fallen earth. The larger opening lies in a north-west and south-east direction, and the smaller chamber trends more to the north. That two passage chambers should lie so close together, ending in the rampart wall, is curious, and I cannot recall another like it.

LISNAGALLAUN (O.S. 65).—In the townland of Shanacloon Upper, about half a mile south-east of the village of Kilgobnet, on Sullivan's farm, is the fine rath named Lisnagallaun on the Ordnance map. It has triple ramparts, the inner and outer, however, being very much defaced. The diameter of the rath is 100 feet, and, from the top of the inner to the top of the second rampart, is 24 feet, the thickness of the ramparts being $13\frac{1}{2}$ feet and 15 feet, respectively, and the depth of the trench between is 11 feet. From the centre of the second rampart to that of the third is 20 feet, and the depth of the fosse between is 9 feet. The whole structure must have formed, originally, a fine work of defence. In the south-west side of the rampart a breach, made in hunting after rabbits, disclosed an entrance to a souterrain, which we examined (Plate I.). The entrance from within the rath was sought for, and, after a couple of hours search and digging, it was found, at a depth of several feet, and cleared out. The structure consists of a triple chamber, and small connecting passages. Entering, from within the rath, is a chamber $14\frac{1}{2}$ feet long, and 2 feet 5 inches wide at the opening, but which gradually widens to 3 feet. The side walls slope inwards, measuring 2 feet 4 inches apart beneath the roof, which consists of four great slabs. The chamber has a nearly uniform height of 5 feet, and is well built of ordinary field stones. The walls round off at the end to a low, well-laid passage, 2 feet high, 1 foot 4 inches broad, and 2 feet long, formed by two single side stones and one top slab. This opens into another passage, at right angles to the first, measuring 10 feet long, $3\frac{1}{2}$ feet wide, and $5\frac{1}{2}$ feet high. The walls slope inwards, and it is roofed by four slabs. Two feet from the north end is another passage, running to the west, similar to the first, measuring 2 feet long, $1\frac{1}{2}$ feet wide, and 2 feet high, formed also by

single jamb-stones and a single roof-slab. This opens into the third chamber, which is 11 feet long, with an average breadth of 3 feet 9 inches, and a height of $5\frac{1}{2}$ feet. It has three roof-slabs, with walls curving inwards, in the same manner as the other chamber. The floor is covered with stones and rubbish, the end of the chamber opening into the rampart having been pulled about in rabbit-hunting. Sullivan's rath seems to have been a central one to others, as there are four in the immediate neighbourhood, lying to the north, south, east, and west of it. There is another at Cooleanig, with a double rampart and deep ditch; in the centre is a choked entrance to a souterrain, but this I did not explore.

LISPATRICKMORE (O.S. 65).—In the townland of Ballyledger, lying under the slopes of Cloughfaunaglibbaun mountain, and commanding a fine prospect of country, is the rath marked Lispatrickmore on the Ordnance maps. It has double ramparts, but they are much defaced. The diameter of the rath is 100 feet, and the inner rampart is 7 feet high on the inside in places, and 18 feet on the outside; it is imperfect for about one-third of the circumference. From the centre of the inner to the centre of the outer rampart is 38 feet, the latter being about 5 feet high in places, from the outside. In the very centre of the rath is an opening to a series of chambers, making a long line, somewhat exceptional in formation (Plate I.). A quantity of loose stones lie about the entrance, and the narrow passage is blocked, making it a little difficult to enter. Within is the first of a series of four chambers, connected by small passages of the usual kind, running in the same direction, and almost in a straight line for a distance of 57 feet. The floors, throughout, are practically on the same level, and the chambers and passages are particularly clean, and fairly dry. They are the largest of the series of chambers I had explored, and to find so perfect an example of the class, was no less pleasing than it was unexpected. The first chamber is a small one, measuring 6 feet long by 4 feet wide, and 5 feet high; the floor is covered with a quantity of loose stones. It is well and strongly built, with the walls slightly curved inwards. From this chamber a passage, 3 feet 4 inches long, 1 foot 4 inches wide, and 1 foot 6 inches high, and roofed by flagstones, leads into a second chamber. This is 14 feet 3 inches long, 5 feet 6 inches high, with an average breadth of 4 feet. The walls slope slightly upwards, and the roof consists of six slabs. Continuous with the north wall is another passage, 3 feet long, 1 foot 3 inches broad, and 1 foot 8 inches high, leading into a third chamber, of a similar character to the others. This measures 13 feet

6 inches long, 3 feet 6 inches broad, and 5 feet 6 inches high, also roofed with six slabs. From this a third passage leads to the fourth and last chamber; the entrance is 1 foot 7 inches wide, and 1 foot 8 inches at exit, is 3 feet long, and 1 foot 8 inches high. The chamber is 8 feet 6 inches long, and 4 feet 3 inches wide, and 5 feet 6 inches high, with sloping walls, slightly rounded off at the ends, and thin projecting cornice stones, on which rest six roof slabs.

LISMARNAUN (O. S. 57).—About one mile north of Beaufort Bridge, off the road to Faha, to the right, is Lismarnaun, known locally as the rath of Rosnacarthan, on Clifford's farm. It stands on a good elevation, and commands a magnificent view of the surrounding country. It has triple ramparts and double trench, and is a particularly fine example of an earthen fort. The inner rampart is partly defaced, particularly on the east side. The enclosed area measures 108 feet in diameter from north to south, and the height from the bottom of the trench to the top of the rampart is 15 feet. From the centre of the inner to the centre of the second rampart is 28 feet, and that between the second and third rampart is 35 feet. The third rampart is greatly defaced on the north and south sides. We heard no reports of a chamber, nor were there any obvious signs of one; but it is very likely that one so important, from its character and position, also contains passages and chambers similar to others so situated.

LISAVAN RATH AND CHAMBERS (O. S. 57).—About one mile north of Faha School, and a few fields to the north-west of where the road fords the Gweestin River, is Lisavan rath, on the farm of Mrs. Leary. It stands at the end of a high ridge that rises rapidly above the little river valley. The view, like that from many of the raths, is a very extensive one, and the spot was chosen for obvious reasons. The rath is oval in shape, and measures 147 feet from north to south, and 100 feet from east to west. The inner rampart is nearly defaced, and the outer is much cut into in places. The depth to the bottom of the trench from within the rath is now about 6 feet, and the width is 15 feet. The thickness of the outer rampart is 12 feet in places, and height varies from a few feet to 12 feet.

At a distance of 35 feet from the west end is an entrance to a souterrain formed by a fallen slab (Plate II.). The roof is 11 feet long, and is formed by four large slabs. The width of the narrow entrance at east end is 13 inches, and the floor slopes down rapidly to a height of 4 feet 8 inches. It rises again to a break in the west end, where there are signs of a further extension of the chamber, but it is choked by fallen rubbish. The walls are built of loose, flat stones, and the

width varies from 2 feet at the east end to 3 feet 2 inches at the west end. Another chamber runs from north to south at right angles to this. The entrance near the south end has been made by a removed slab, and the full length of the chamber is 12 feet 5 inches; it measures 1 foot 6 inches wide at the north end, and 3 feet 2 inches in the middle. It is 2 feet high, and roofed by four immense slabs. The whole has been much injured in the course of time, and the east end of the first chamber is choked, and the connection could not be shown without clearing. The trouble would hardly be repaid, as there are no indications of any special feature to be discovered.

POULNARAH, MILLTOWN (O. S. 47).—About half a mile from Milltown, on the left of the road to Kilburn House, is the fine rath named Poulnaraha. It is splendidly situated, and has a good double rampart; the outer has been much cut into in places; it is 8 feet high on the outside, 16 feet on the inside, and 14 feet wide in some places. From its centre across the fosse to the centre of the inner rampart is 32 feet, and the height of the latter is 12 feet. The breadth of the rath is 130 feet. It is planted with trees, and disfigured by a small, modern house, built within the enclosure, by the owner of the soil, as a summer pleasure house; but this is now abandoned and in disrepair. On the north-east side is a great hollow, descending in a low but precipitous cliff of rock from the inner rampart to a depth of 35 feet. The outer rampart ran to the edge of this, so that the hollow formed a natural protection on this side. Over a ledge of the cliff the inner rampart is broken, and an entrance formed into a chamber $10\frac{1}{2}$ feet long and 5 feet high; it varies in width from 4 feet to $3\frac{1}{2}$ feet (Plate II.). The walls are of large, field stones, built in the usual fashion; and the roof is formed of four great slabs completely covering the chamber. From this a passage opens to the west, measuring 2 feet 9 inches long, 2 feet 2 inches wide, and $2\frac{1}{2}$ feet high. This enters a second chamber, now unroofed, measuring $14\frac{1}{2}$ feet long; the walls curve inwards in the usual fashion, the breadth at the bottom being 3 feet 4 inches, and at the top 2 feet 2 inches. The floor is covered with the fallen slabs and loose stones, but the walls are fairly perfect. A slab in the ground near the surface indicates that a passage opened off the west end of the open chamber, but this is now closed, and we had no opportunity of getting permission to explore it further. The whole forms a very good example of an inland cliff fort, and, considering its position, by the roadside, the road actually cutting into the outer rampart, it is in a very good state of preservation.

KNOCKAGARRANE SOUTERRAIN (O.S. 57).—A few fields to the south, on the farm of Pat Clifford, are traces of a small rath, in which is a small but fine souterrain (Plate II.). It is open, very dry, and particularly well built, and the floor covered with loose stones. It is entered from the field by a low, square opening, measuring 1 foot 6 inches broad, and 2 feet 6 inches high. The chamber is 11 feet 6 inches long, running in a north-west and south-east direction, with an average width of 3 feet at the floor. The walls are evenly and regularly built, the stones being set with small spawls—an exceptional feature among the chambers we examined; the walls curve gradually inwards, and the width at the top is 2 feet 6 inches. The chamber is 5 feet high, and roofed by six large slabs in the usual manner. At 5 feet from the entrance a passage runs to the north-east; it is 1 foot 8 inches wide, 2 feet 2 inches high, and roofed by two large slabs. At a distance of $3\frac{1}{2}$ feet it is defended by two jambs set on edge, standing each a couple of inches in, on which is a sill fixed upright on edge, and closing the passage to a height of 1 foot 2 inches, and a width of 1 foot 4 inches. This forms an excellent defence to further progress of the passage, which is now closed at a distance of 5 feet beyond by a fallen stone.

I located other souterrains in the district; and at Glencar I discovered many more, four of which I explored. In County Mayo I explored six more, making a total of eighteen, planned and measured this year. I think, however, those that I present are more than sufficient for one paper, and sufficiently typical, too, of the rath-chambers in this district of Kerry. As will be seen, they are simple enough in plan, and those built of stone are all alike in general structure. They are well and carefully built; and in a country where dry-stone walls are plentiful, none of the latter can be said to equal, much less excel, the admirable manner of stone-laying which characterises the walls of the rath-chambers. None of the souterrains that I examined had any means of ventilation, except from the entrance; nor was there any case of a difference of elevation in the narrow passages between the chambers for the purpose of defence, which has been found in some of the more complicated chambers elsewhere. Some of the passages were sufficiently narrow to make it a little unpleasant to get through; but I found none too narrow for a person of moderate dimensions to squeeze through. But I do not think the chambers were built by a race of big men, but rather by a race of men of moderate size, if indeed not small. The chambers and passages clearly showed their original intention as places of temporary retreat or

refuge, or for storage, and little else. In none did I find any traces of ashes or cinders; nor could I hear from any of the peasantry that they had ever heard of their being used by men "out on their keeping," to use a well-known phrase of bygone days; although I have no doubt they were used as hiding-places in modern times, by men who had reason to fear the strong arm of the law. In one case I was told that cinders and ashes had been found at the entrance to a set of chambers within a rath which had been cut up into potato plots. This was on the farm of a man named Scully, of Nuntinane. But as there was much difference of opinion locally as to where the opening lay, and as the entrance had been filled in, I did not make any exploration.

THE GORTBOY STONE (O.S. 65).—On the north side of the slopes of Knocknafreeghaun, a low ridge of the Reeks, and three miles to the south-west of Beaufort, and due north of the Hag's Glen, is Gortboy (Ordnance), 'the yellow field'; and to Dr. Digby is due the credit of having discovered this stone some few years ago. It is reached by a road on the left, half a mile short of Gaddagh Br., and up a bohreen crossing the Owenacullin river. It is a wild, wind-swept district, and much of the land is rocky and bare. In one of the fields is a huge boulder, or rather earth-fast rock, somewhat rectangular in shape, of the purple grit of this district, and lying north and south. It measures 7 feet 8 inches long, 5 feet 8 inches broad at the south end, and 4 feet 6 inches at north end, the heights respectively being 2 feet 6 inches, and 2 feet 3 inches. A section from north to south would show a slight curve, as the rock is a few inches higher in the middle than at either end. The greater portion of this massive rock is covered with an extraordinary number of cup-markings, and cups with concentric circles. There are connecting channels everywhere, and the whole, though apparently intricate and unmeaning at first, yet shows, on examination, evidence of intention and design. It is much worn and weathered, and the north end has no markings. It is difficult to take a good rubbing of it, and still more difficult to sketch the markings, as the more it is examined, the more work does it show (Plate III., fig. 1). As far as our experience goes, it is one of the finest examples of this particular class we have yet seen in Ireland, and the wonder is that it has remained so long unknown to Irish archaeologists. It is not my intention to enter on the vexed question of the origin and meaning of the cup and circle-markings upon which so much has already been written, or upon their distribution in so many lands, even to distant Australia. I have little doubt that had the stone been known to Dr. Graves he would have used the markings in support of his theory,

for the number of raths in the surrounding county is very great, and the number of souterrains somewhat exceptional. But I do not think from an examination of the rubbing, and the Ordnance map, that the stone supports the Bishop's theory.

A peculiar feature of the ornament consists in the groups on the top left-hand corner, not unlike the tentacles and cupules of a cuttle-fish. The dumb-bell-shaped ornament is found on other stones, but the truncheon-shaped figures on the right below are, I think, exceptional. The circles and cup-markings bear a strong resemblance to those on the Mevagh inscribed stones, County Donegal, illustrated by Mr. Kinahan in vol. xviii. of the "Royal Society of Antiquaries Journal." In considering the various theories and suggestions made in connexion with these rude cuttings, it is much more easy to say what the Gortboy stone is not, than to say what it is. A glance will prove that it shows a certain amount of intention and design; but it cannot be said to fit any particular theory. It will have its place, however, in the already well-filled list of stones that Ireland possesses, containing the many varied forms of rude prehistoric ornament. It is well to mention in connexion with the stone that about a quarter of a mile immediately to the north is a fine rath, with double rampart built of stone and earth. The inside measurement is 120 feet from north to south, and the inner rampart is 10 feet thick in places. The width of the trench is about 16 feet, and the outer rampart varies in height from 3 feet to 6 feet. In the centre is a small circular enclosure of stone much defaced, 20 feet in diameter, from which a low rampart runs to the east nearly across the rath. Time did not permit me to test if a souterrain existed.

KILCLOGHERANE BULLÁNS (O. S. 58).—At Kiloclogherane, up an old by-road, off the main road from Aghadoc to Milltown, two miles from the latter, is a spot still frequented as a place of pilgrimage. On the left-hand side, about a quarter of a mile up, is a bullán stone set in a hole in the ditch, about breast-high, an unusual place in my experience. A number of bottles, a dozen or so, small and medium size, lay about the stone. Immediately, and off the left side of the bohreen, is an old hawthorn-tree, surrounded by bushes, brambles, and ferns, growing in wild and luxuriant confusion, and through which a tangled pathway runs. There is no trace of any building or ruin of any old church here or in the immediate vicinity; but here the pilgrims say their rounds, and tie bits of rags on the hawthorn-tree and bushes. It is a curious, old-world, out-of-the-way spot, and I could find no cause why it was frequented. Another bullán stone, the

water of which cures, lies some yards further on in the bottom of the ditch, on the right-hand side, with rags hung about, where prayers are also said. Notwithstanding the long spell of dry weather preceding my visit, both the stones had water in them, received from the droppings off the bank and bushes above, and to which due superstition is attached. That the stones are never without water is due to the fact of their being set well into the banks and practically covered, so that there is very little evaporation from them.

INSCRIBED STONES NEAR GLENCAR (O. S. 72).—In Shanacashel townland, about 200 yards from the cross-roads, on the right of the road from Glencar to Killorglin, within the fields at a spot called Knocknamorriv ('the hill of the dead'), are three inscribed stones. As far as I know they had not been noticed up to the time of my visit, and the peasantry generally were not aware of their existence. They lie at the back of a ditch in one of the fields, and consist of the purple grit common in the district. Stone A (Plate III., fig. 2) is rudely rectangular, and measures 19 inches by 15 inches. The special feature is the radiating lines from the concentric circles on the top corner; and the scribing as a whole resembles a rough map or plan of a district. The rectangular figures are a familiar pattern on other inscribed stones.

Stone B (Plate III., fig. 3) is a coffin-shaped block with a nice example of the dumb-bell circular ornament; the stone measures 51 inches by 21 inches. Stone C (Plate IV., fig. 1) is more elaborately carved, but the face of it has much weathered; it measures 48 inches by 16 inches. The ornament combines the concentric circles and the rectangular patterns of the other stones. I have examined most of the illustrations already published of the Irish inscribed stones, and made some comparisons; but anything I could now say would only be in the nature of speculation, and I must content myself with submitting the rubbings and drawings of the Gortboy and the other stones with the concise description here given.

I could get no explanation locally of the origin of the name of the spot; the ground about is barren, and very poor, and plenty of loose stones lie on the surface; but in the examination I gave of it—not a thorough one—I could not see any signs of battle burials. I found cashels, clochauns, souterrains, and standing stones in the immediate neighbourhood; so that the existence of these inscribed stones is easily explained from the evidence of a people dwelling here in primitive times. I shall not touch upon these remains, as I have not completed my investigations in regard to them.

PRAYER-STONE AT AHANE (O. S. 64).—In Ahane townland, on the side of a high ridge overlooking the old mountain road to Killorglin from Glencar, and about three-quarters of a mile from the cross-roads, is a small killeen with a number of rude, plain grave-stones. It has one large slate slab, measuring 48 inches from the ground, 14 inches wide, and $3\frac{1}{2}$ inches thick. On it are a cross and a circle embracing the horizontal line as a diameter, and cutting the perpendicular line. (Plate IV., fig. 2). All the lines have been made by simply scratching the surface with a small stone held lightly in the hand. This has been done by the peasantry, who say rounds here, and who rub the stone on the pattern indicated after each recital of their prayers. Set in a heap of stones marking the site of a holy well at Kilgobnet old ruined church, near Beaufort, is a small stone with what may be called a cross-series scratched on the surface, and which has been formed in a similar manner (Plate IV., fig. 3). I have visited a large number of places throughout Ireland sacred to the peasantry, and have found this practice sufficiently uncommon to mention it here and give an illustration of the Ahane and Kilgobnet stones.

CROSSES AT CLOON LOUGH (O. S. 82).—Hearing of some stones with marks on them beyond Cloon Lough, Glencar, I visited the place by boat, and after a heavy tramp across the bog at the head of the lake found two crosses. Knowing how thoroughly the late Bishop Graves had ransacked Kerry for ogam and rude stone monuments, I had a lingering impression that these crosses could hardly have escaped him or Mr. Hitchcock. On searching the Academy's Transactions, I found that he had visited the place in 1870, and described the stone in volume xxvii. The crosses are, I believe, unique, and of sufficient importance to my mind to justify me in bringing them again before the notice of the Academy after such a lapse of time. No one in the neighbourhood, or at Glencar, remembered Dr. Graves's visit; nor had any stranger, as far as I could gather, seen them for the purpose of any examination. This, as the Academy's Transactions show, was not the case; and it only exemplifies the thoroughness with which Dr. Graves pursued his investigations.

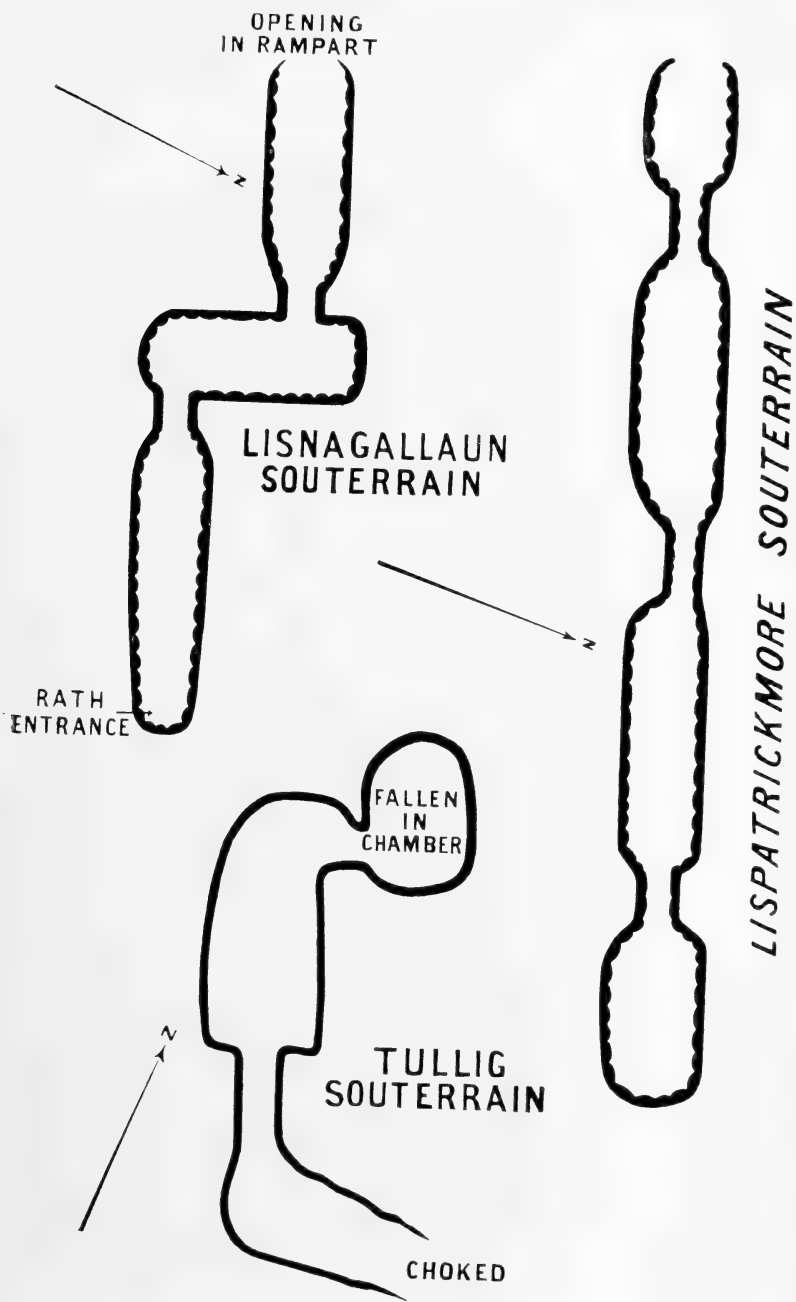
The stones lie about a quarter of a mile beyond the south-east corner of the lake. Further south is a small sheet of water. Lough Reagh, at the foot of a steep amphitheatre of mountains, and the bog lying between the loughs is of recent formation, as the waters were, no doubt, at one time united. The spot where the crosses stand seemed to me to have been a crannog. It is small and circular, being 88 feet in diameter. The circumference is indicated by a low,

thin ridge about 18 inches high. The grass on it, and in the enclosure, differs from the coarse, sedgy grass without. The crosses stand within, close to the edge on the east and west sides. They are of thin slabs of grit, and rest in two coarse, flat sockets, pierced through by circular holes just wide enough to hold the crosses upright. The lines of the designs were well and clearly cut originally, but the stones have weathered considerably. Unfortunately, one of the crosses was broken a few years ago by boys into six pieces; but as the fractures are clean, it could easily be put together with cement. Close to the foot of the east cross is a fine bullán stone, and beside it a rude heap of stones which may mark a burial. Dr. Graves calls the spot a killeen, and it is no doubt a good name to give it; but there is no other sign of burial within the enclosure, nor anywhere near it. The place is very remote, and the Cloon valley very thinly populated, as the district is very mountainous, and the land of the poorest. On the side of the mountain, about half a mile away to the east, is a holy well, with the usual story of a sacred trout attached to it; and the well and the crosses have been occasionally visited by pilgrims to say rounds; but no one has visited it for some years now for this purpose.

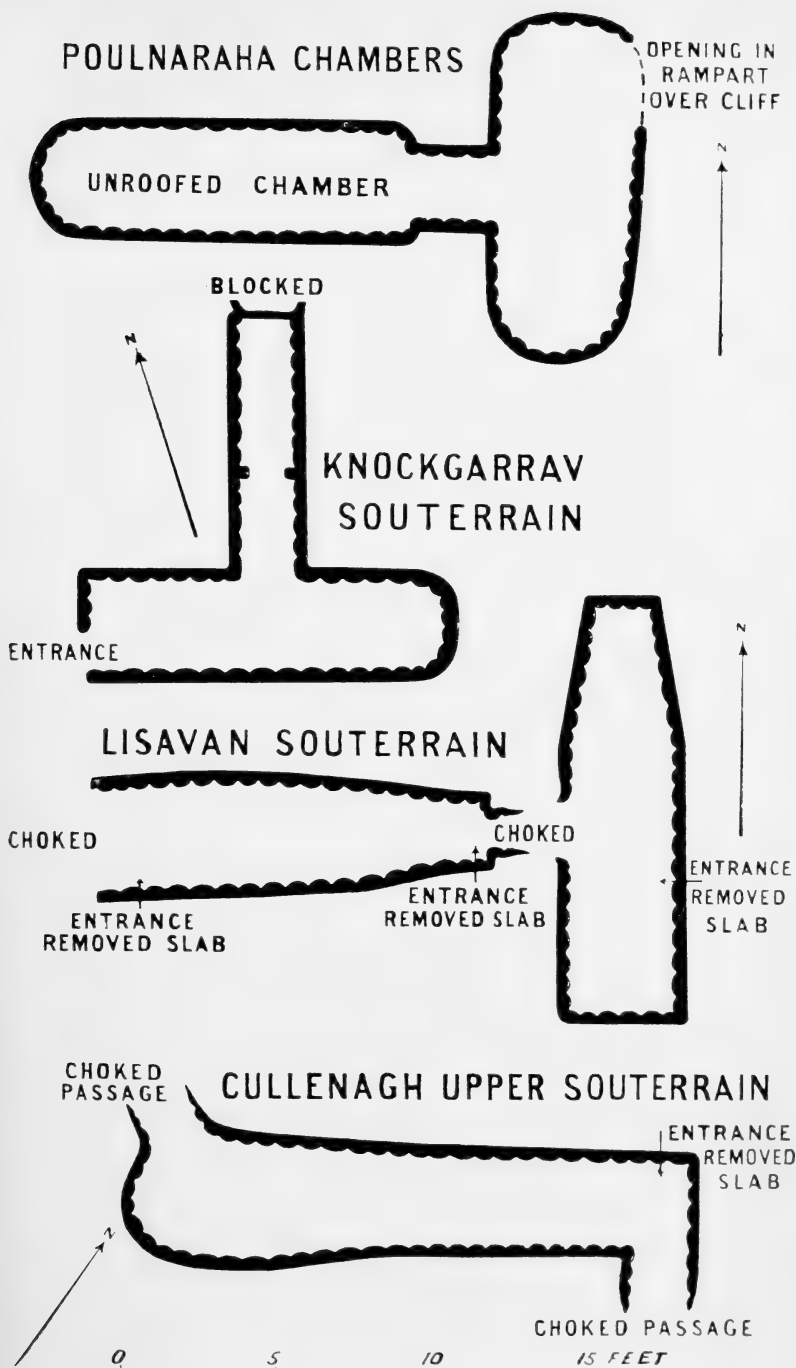
Not having proper material for complete rubbings, I was obliged to visit the spot again some weeks later. Heavy rain had fallen for a couple of days, and the bog was wet, and walking difficult. I found the ring enclosure practically covered with water, which confirmed my original impression that the spot was a crannog site. The aquatic and bog-plants covering the area between the loughs are very luxuriant, and rapid bog growth is apparent to any observant eye. It is probable that the spot was selected as something uncommon, and the fairy ring Christianised by the erection of the crosses and the placing of the bullán. The stones form so rude a heap, it is impossible to judge what they mark. A small clochaun may have stood here, as the ground is higher and drier on the east side than on the west; or it may be the site of a burial. The bullán may have been used for baptismal purposes, as we know that, though their original purpose was for pounding grain and roots, many on church sites show that they were used as fonts, just as a domestic bowl at the present day may be used in cases of emergency.

As Dr. Graves has described the designs on the crosses very effectually, I need not enter on a description—it would be but repeating inadequately what he has said. His drawings, however, illustrating his paper are quite small, and it is a pleasure to me to submit the rubbings, which give a better impression of the unique

character of their design. The stones have suffered somewhat since 1870, and the cuttings on the side of the broken one are not now so evident as they were, and his drawings are, therefore, all the more valuable. One of the curvilinear swastikas has also much scaled since, but the other is quite distinct in the rubbing. The crosses, as is apparent, are not of the earliest type of design, and may probably be assigned to the later half of the ninth or early tenth century. The curvilinear swastika is so rare, no other case of it, so far as I know, having been found in Ireland, that it is to be hoped that these crosses will be permanently preserved.



Souterrains in Beaufort District, Co. Kerry.



Souterrains in Beaufort District, Co. Kerry.



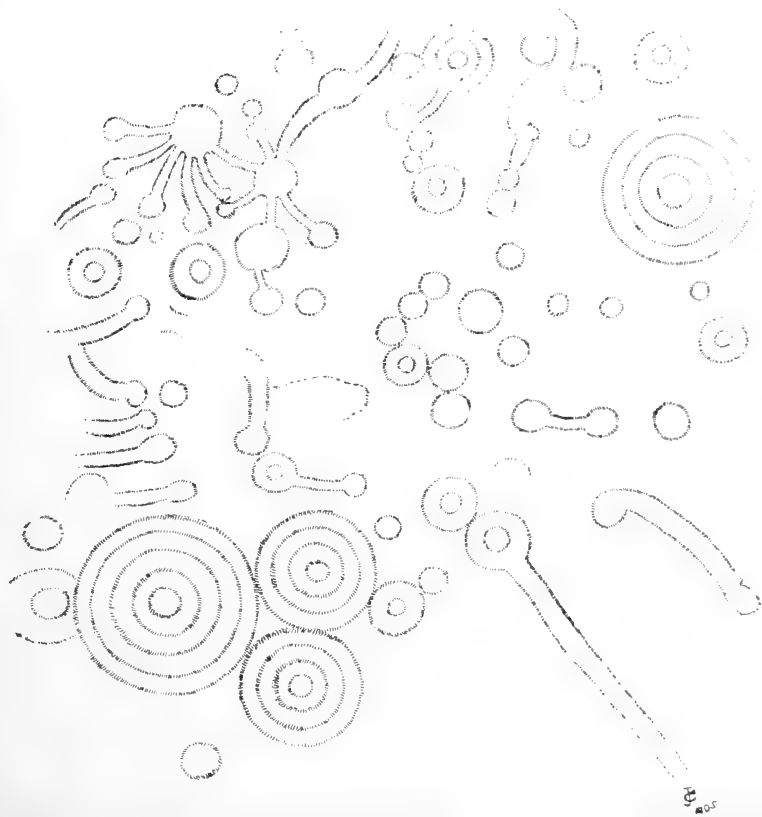


Fig. 1. Antiquarian Remains of Beaufort District, Co. Kerry.

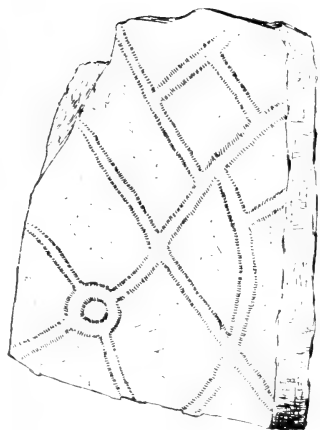


Fig. 2.

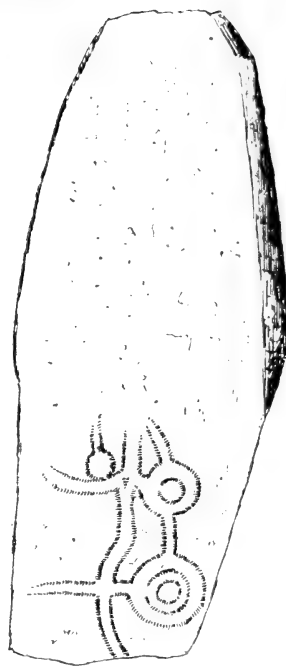


Fig. 3.



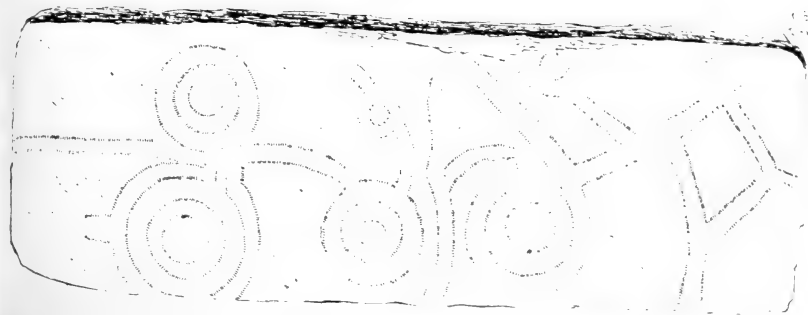


Fig. 1.



Fig. 2.



Fig. 3.

Antiquarian Remains of Beaufort District, Co. Kerry.



II.

THE MANUSCRIPT KNOWN AS THE LIBER FLAVUS
FERGUSIORUM.

BY EDWARD GWYNN, M.A., F.T.C.D.

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THE *Liber Flavus Fergusiorum* at present consists of 92 vellum folios, bound in two volumes. The first of these contains 37 folios, the second 55. The ms., though written at various times, seems to be the work of one scribe. His name was perhaps Aed, as is suggested by the note on vol. i., 15 *verso, b*. But this note may be a later addition, and anyhow there is nothing to show who Aed may have been. Some inferences as to the provenance of the codex may, however, be drawn from a note which occurs in vol. i., folio 23 *recto*, col. *a*: "Sean Ua Conchobair put these small matters into Gaelic, and Donnchad ua Maelchonaire wrote them at Lios Aedain in Ciarraige Airde, in the house of Ruaidri ua hUiginn, in great haste: and I implore mercy of Christ." This note comes in the middle of a column, and therefore was probably in the ms. from which the scribe of our ms. was copying: had Donough O'Mulconry been the writer of the *Liber Flavus*, he would probably have inserted a note of this sort at the bottom of a column, after the usual practice of scribes.

The O'Mulconrys were hereditary 'ollaves' of the Síl Muireadh-aig: see Four Masters, *an.* 1232, 1270, 1384, 1404, 1468. Of the Síl Muireadh-aig, the O'Conors of Roscommon were an important branch. It is quite likely that the first two persons named in the note just cited were the Seán ua Conchobair whose death is recorded by the Four Masters under the year 1391, and the Donnchadh Bán ua Maelchonaire who died in 1404. It is also possible that their host was the Ruaidri Ruadh ua Huiginn, *saoi fir dhána*, whose death is mentioned in 1425.*

*Lis Aedáin is placed by Hennessy (*Index to Annals of Loch Cé*) in the

The Magnus mac Mathgamhna, to whom the discourse in vol. ii., 14 *v° b*, is addressed, probably belonged to the same family as Scán ua Conchobair: Manus and Mahon were both names very common among these O'Conors, as a glance at the Index to the Four Masters will show.

As to the Augustine mac Raighin mentioned as a translator at vol. i., 32, *v° a*, see Plummer in ZCP. v. 453. He was a canon of Oilén na Naomh, that is, Saints' Island in Lough Ree. As Lough Ree separates County Roscommon from County Longford, this item of information agrees with the indications of locality already obtained. And perhaps this Mac Raighin, who died in 1405, belonged to the same family as the Piaras mac Craidin mentioned by the Four Masters (*an.* 1512), as Dean of the Clann Aodh; this clan, according to O'Donovan, belonged to the barony of Longford.

These assumptions are in accordance with two dates which occur in the MS. In vol. i., 29 *recto*, col *a*, the year 1435 is mentioned; and, in the first folio of vol. ii., though much defaced, the figures 1440 are still legible.

Of the subsequent history of the codex not much is known. In the eighteenth century, it was in the possession of a Dr. John Fergus, a collector of books and MSS. (*Irish Quarterly Review* for 1853, p. 608, note. This article is by the late Sir J. T. Gilbert). This Dr. Fergus practised in Dublin, where he died in 1761; but it seems likely that he came from the West. Enquiries made at the Record Office show that a Hugh Fergus, of Galway, who made his will in 1758, was a Doctor of Medicine. William Fergus, of Tuam, who made his will in 1798, was also a Doctor of Medicine. Medicine, like the other liberal arts, was often hereditary among the native Irish families, and members of such families frequently became regular practitioners. (See Joyce, *Social History of Ancient Ireland*, i., 601.) It is probable, then, that John, Hugh, and William Fergus belonged to such a family, belonging to some part of Connaught.

The title which the MS. now bears indicates that it had been an heirloom of the Fergus family. I have found no internal evidence in

parish of Tibohine, Co. Roscommon. Ciarraige Airde will, therefore, be a mis-writing of Ciarraige Airtich, a district which (according to O'Donovan, *Leabhar na gCeart*, p. 103, note) comprises the parishes of Tibohine and Kilnamanagh. Dr. Hogan, to whom I owe these references, suggests that the name Lis Aedáin survives in Lissian, now a townland in the barony of Frenchpark.

favour of this supposition; but Dr. Fergus himself must have been satisfied of the fact; for, at his death, while the rest of his collection of MSS. was sold to the Library of Trinity College, the *Liber Flavus* was bequeathed to his daughter. This lady married a Kennedy, member of a distinguished Irish family, whose history is related in a note to Gilbert's History of Dublin Streets (Irish Quarterly Review for 1853, p. 608). From this note the facts just stated have been taken. There is inserted into the second volume of the MS. a table of contents written by James Marinus Kennedy, which concludes with this note:—"Copied from the Index of the two MS. volumes or parts, called *Liber Flavus Fergusiorum*, made by Mr. E. Curry, and dated the 11th of June, 1841. The late Mr. James Hardiman (the historian of Galway) had the care of them at that period, being lent to him many years prior by my father, the late Macarius John Kennedy." Dr. Whitley Stokes points out to me that the quotation from the Life of S. Moling, at p. 348 of Petrie's *Ecclesiastical Architecture* (2nd edition), is taken from the *Liber Flavus*. The note just quoted explains why Petrie described the MS. as belonging to Hardiman. The MS. had descended to Mr. James Marinus Kennedy, when O'Curry made use of it for his *Lectures on the Manuscript Materials of Irish History*. In this book (p. 532) will be found the table of contents above mentioned, which, however, is far from being complete. In 1875 Mr. Kennedy, at Sir John Gilbert's request, deposited the codex in the Royal Irish Academy.

Most of the folios are numbered on the *verso*, in a hand seemingly of the sixteenth century; but the numbering differs altogether from the actual order of sequence, and would, if followed, give an entirely wrong arrangement. This older pagination begins with what is now volume ii., and runs continuously for 29 folios, except that fol. 1 is lost, fol. 13 (?) is misplaced, and fol. 26 has been omitted from the numbering. The present first folio of vol. ii. is so defaced as to be almost illegible, whereas the first folio of vol. i. has suffered much less. These facts make it probable that the MS. originally began with (present) fol. 1 of vol. i.: so that this, being the outside leaf, suffered to some extent. At a relatively early date, however, the MS. fell into confusion; and the original fol. 1 found its way into the body of the book, and thus escaped further defacement. In this condition of things, while the folio now lost from the beginning of vol. ii. stood first in order, the old pagination was added; and the volume must have long retained this arrangement in order that the outside leaves should have suffered as they have done.

The ms. may have been first rescued from its state of disorder at the time when it received its present binding. To judge from the lettering, this must have happened between 1800 and 1850, so that it was very probably O'Curry who restored the proper sequence. The present order is correct, except that fol. 25 of vol. ii. should be fol. 13 (?).

Several folios have been lost: 92 remain, but fol. 52 of vol. ii. is numbered 105 in the old pagination, so that 13 folios at least are missing. There are gaps before ff. 25 and 32 of vol. i., and before ff. 1, 15, 38, 43, and 51 of vol. ii. In the description which follows, the first number denotes the present order; the numbers in brackets are those of the old pagination, where it is decipherable.

The contents are almost entirely ecclesiastical or hagiological; the few profane legends which are included are almost all connected with some saint. The text, though incorrect, is usually sufficiently intelligible, except in the few comparatively early compositions which the ms. comprises. The script is not difficult, except for some pages which have been more or less completely obliterated.

VOLUME I.

f. 1 [55] r°.

This page is in great part illegible. It begins the legend of the Invention of the True Cross, corresponding generally to that given in L. Breac 231^b-232^b; it is, however, an independent version. The piece ends—

7 cebe neach cuimneochus an croch nãmh do geobha se cōaitiōm (comlãinius? cf. L. Br. 232^b 30) fa re mathar Crist don lo deidenach 7 rl.

f. 2 [56] r° b—[A]pud sanctum Dionisium et setera.

A copy of the story edited under the name of *Stair Fortibrais* by Wh. Stokes in Rev. Celt., xix. 14 sq. Ends—

cotairne sdair Serluis Moir ag leanmhuin Coroini Crist 7 taisi na nãmh annsin.

f. 10 [63] r° b—Rig rogab an doman feacht naill .i. Consantin mac Elena.

Story of the healing of Constantine. Another copy from Harl. 52^o has been printed by K. Meyer in ZCP. iii. 227. Ends—

roemdaigh sean Consattin Pol do cathraidh righa.

f. 10 [63] *v*^o a—Sedrus 7 cipresus 7 palma 7 oliua.

On the four kinds of wood out of which the Cross was made. Another copy in T.C.D. 1285, p. 140. Ends—

Issu Crist mac de bi 7 æn mac an nathur neamba.

f. 10 [63] *v*^o a—Feartar dano ænach Tailltin la Diarmuid mac Cearbuill.

The story of the decapitation of Habakkuk: edited by O'Grady, *Silva Gadelica*, i. 416. Ends—

conadh ingnadh d'ingintuibh aonaidh Tailltin sin.

f. 10 [63] *v*^o b—Teora hurgartha righ Laigin.

Of the restrictions and privileges (*buada*) of the Kings of Leinster, Munster, and Tara. Cf. *L. na gCeart*, p. 2. Ends—

maisi in bliadhuin i toimela sin uili ni rada in airim sæghuil dho.

f. 10 [63] *v*^o b—Bai righ ambra for Erind.

The story of Niall Frosach, which is also found in LL. 273^b. Ends (f. 11 *r*^o a)—

Flann frosach nominatur 7 Niall frosach.

f. 11 [64] *r*^o a—Araile feallsumh arabai da fiarfaidh da mac cia lin do cardib dorinnuis cose duit.

How a philosopher asked his son how many friends he had? A hundred, says the son. I never found but one real friend, says the philosopher; and he recommends his son to test his friends. The test is this: he is to take each apart and inform him that he has killed a man, and then observe the friend's behaviour. They fail under the test. Then the father sends him to visit a friend of his own; to him the son pretends that his father has fallen into poverty, in spite of which he is treated with all possible kindness, and in the end the host sacrifices even his wife to friendship. The story ends abruptly and appears to be incomplete. Ends—

Dorrinni amlaid sin. Ro seol fo thuaidh.

f. 11 [64] *r*^o b—Triar foghlainntigh.

This piece is printed in O'Curry's MS. Materials, p. 529.

f. 11 [64] *v*^o b—Sleigheadh la Donnacadh mac Floind.

This story has been edited by K. Meyer, *Gaelic Journal*, iv. 106.

f. 11 [64] *v*^o b—Se hinganta deg dobadar oithchi geinidh Crist.

Of the wonders at the birth of Christ. Cf. L. Breac 132^b–133^b (a fuller account). A poetical version has been printed by K. Meyer in ZCP. v. 24. Ends—

trena teangthuibh fein in oidhchi sin.

Folio 12 is a slip of vellum, less than half size.

f. 12 [—] *r*^o a—Cuicc comurdha dec bratha annso.

Fifteen signs of the Day of Judgment. Ends—
bertar breath doibh amlaidh sin.

f. 12 *r*^o b—Fott fabaill.

A note, in four lines, on the distance from the Garden of Eden to the “House of the Trinity.”

f. 12 *r*^o b—In toibreochan doni tu.

Some unconnected aphorisms. Ends—
do cruinnidh se do laideochadh. (?)

f. 12 *v*^o a—Dena urnaithi no sduider no sgribadh.

Of the classes of men who are unworthy to receive the Host. Ends—

daine ataid a n-adaltras follus.

f. 12 *v*^o a—Eidersgeoil mor mac Cuair rogheoghuin Nuada Neacht.

Of the eric which Ederscel Mor paid for killing Nuada Neacht. Ends—

in Conuire rosceanguil.

f. 12 *v*^o b—Ceithre primchana Erenn.

A note, in four lines, on the Law of Daire, Law of Patrick, and Law of Sunday, and the Law of Adamnan.

f. 12 *v*^o b—Martan dano ise tue bearradh manaigh ar Padraic.

A note, in five lines, on the honour appointed by St. Patrick to be paid to St. Martin.

f. 12 *v*^o b—Manaigh Padraic.

Some of St. Patrick's monks were threshing corn on St. Martin's Eve, when a *sechnap* came up driving oxen to the church (as an offering in honour of St. Martin): among them a vicious bull (*tarb mear*). “You are giving the ground a good threshing,” says

the *sechnap*. “What if we threshed your bull?” they ask. “You may,” says he: so they threshed the bull with their flails till they killed him: hence the saying “Martin’s bull.” Ends—

conadh(d)e sin aderur tarb Martan osin a leith.

f. 13 [65] *r*^o a—Bai briughaidh cetach amra irdraicc.

A Life of St. Moling. Fælan finn, son of Feradach, fell in love with his sister-in-law, Emnait: being with child, she escaped homeward to the Cenel Setnai; on the way she was caught in a snowstorm, and, in her misery, gave birth to a son, whom she wished to kill, but a dove from heaven protected him. Brendan mac Finnlogha finds her, and takes the child under his protection. He is baptised by Collanach, a priest of Brendan’s household, by the name of Tairchell. He is brought up by Collanach; and when seven years old asks to be allowed to go forth as a mendicant—*tiag for a druim 7 tiadh for a ucht...gran 7 aran isin dara teigh, 7 mæthla 7 im 7 saill isin teigh aile, 7 ballan dornn ina laimh cli*—“one wallet on his back and another on his breast . . . grain and bread in the second wallet, and biestings, butter, and bacon in the other wallet, and a small (?) cup in his left hand.” After sixteen years of this life, he meets one day, in Luachair, a *fuath angeda* with his wife, his gillie, his dog, and nine of his household. The *fuath* threatens Tairchell with his spear, and Tairchell promises to lay his staff across his head. Then Tairchell asks a boon: to be allowed to take three strides. This is granted: and at his first leap—*nirbo mo leo he na fiach for beinn cnuice: an leim tanaise roling ni facadar etir he: an treas leim vero roling is ann dorala he, for caiseal na cilli*.—“he seemed to them no bigger than a raven on a hill-top—at the second leap he took, they lost sight of him altogether: but at the third leap he lit right on the church-wall.” The spectral crew give chase, but the *scolai*de takes refuge in the church where Collanach is finishing Mass. On Tairchell’s telling his adventures, the priest declares that his three leaps are the fulfilment of a prophecy, and that from them he shall be called *Moling* of Luachair. The story goes back to tell how Brendan had wished to settle on the Berba [Barrow], but had been warned by the angel Victor that the site was reserved for Moling. Moling’s mother now reveals to him the story of his birth. He receives tonsure, and is conducted by Collanach to Moedoc of Ferns, with whom he leaves a blessing, and goes on to Cashel, to visit Fingin mac Aeda: he wishes to settle here, but is warned by an angel to go to Ross Bruic on the Barrow.

What follows is partly summarised by O'Curry, *Manners and Customs*, iii. 34: the legend tells how Moling's eye was put out by a chip, and miraculously healed, how he succoured a leper who turned out to be Christ in disguise: how Christ appeared in the form of a boy of seven: how he caught a salmon, with a lump of gold (*teinne oir*) inside it.

Then comes the story of Gobban and his wife: see M.C. iii. 35-6. After this we have a story of a dispute between the sons of Aed Slaine and the Leinstermen. The latter insist on having St. Moling's arbitration on a frontier question: in spite of the treacherous intention of the sons of Aed Slaine, the saint comes: he is entertained at a place called Tnuthel by a woman and her husband, and the poor fare they offer him is miraculously altered. Next comes a condensed version of the story of Moling's diplomacy, and the trick by which he got Finnachta to remit the Borama: cf. LL. 305-307. Adamnan's visit to Finnachta is barely referred to. Alasan, Finnachta's *trenfer*, and his men, pursue Moling; but when they overtake him, he causes them to slay each other.

The Life ends with the tale of the gnat, the wren, the fox, and the dogs, which is told also in the Life in Codex Kilkennensis. See "Ancient Life of St. Molyng," by P. O'L[eary], Dublin: 1887, p. 22.

I learn from Dr. Whitley Stokes that there is another, and apparently a better, text of this Life in the Brussels collection. Ends—
isin dara bliadain ochtmoghad a aisse.

f. 15 [67] *v*^o b—Da bron flatha neime.

The Two Sorrows of the Kingdom of Heaven. Edited by G. Dottin, *Rev. Celt.*, xxi. 349. Ends—

cuníd he gebus cloidhem do a oiti Crist.

f. 15 [67] *v*^o b—Tainic dano dearbairdi inguntach chucu 7 ni ro creidsid do.

Of signs that appeared in the Temple of Jerusalem: a great light which shone out, and lasted an hour and a half: and a cow which, when brought to the altar, dropped a woolly lamb. Ends—

7 ni rocreidsid foss dosin.

f. 15 [67] *v*^o b—As imadh agla ar m'anmuin.

Two stanzas on the fear of death and hell.

The column ends with the words (written in darker ink)—

As ole an gles so et an dubh leis beth st 7 te(?) cum fir an leabair seo o Aedh.

f. 16 [68] *v*^o a—Bai ingreim for Cristaídaib a n-aimsir Deicin.

The passion of St. Christopher : cf. *Leabhar Breac*, 278^a. Ends—
7 ni dearnaidh irchoid iarsin in sruth don cathraig.

f. 17 [69] *v*^o b—Maghnus dominus noster.

A copy of the *Fis Adamnain* : ed. Windisch, *Irische Texte*, 1.
Ends—

in sæcula sæculorum amen.

f. 20 [72] *v*^o a—Lethareigreimunn (?) ina shuim fein co ndlidhid na sagaird 7 na cleiridh na se neithi so do comhed.

Six points of behaviour to be observed by ecclesiastics at meal-time. The first two or three words are obscure, and seem corrupt : they probably conceal a quotation from some author. Ends—

a tosach 7 a ndeireadh na codach.

f. 20 [72] *v*^o a—Fleadh mor doroinneadh a mac do Diarmuid mac Cerbaill.

Edited by Stokes (*Lives of the Saints from the Book of Lismore* : Pref. xxvii). Ends—

isin linn Breasal.

f. 20 [72] *v*^o b—Inspitt de crabadh scoili Sinilli.

On the religious practices of the School of Sinell (or Sinchell) of Cell Achaid.

The piece ends with two stanzas attributed to Colum Cille, beginning—

Ceall gin abbaid, ole an bes,
inunn ocus cruít cen ceis.

f. 20 [72] *v*^o b—Araile manach robai oc procept.

An anecdote telling how a sinner was brought out of his grave by the power of holy water. Ends—

is aire sin nach anuim astigh.

f. 20 [72] *v*^o b—Bannscala maith dobi na hoigh sa domun toir.

Of a woman who was chaste, but a scold ; and how after death her body was cut in two, and the lower half only was buried in consecrated ground. Ends—

is follus gu nach cora do duine ball de seacha a ceile da ballaib do cengul re crabbadh acht iad leath ar leath 7 rl.

f. 21 [73] *v*^o a—[A] athuir 7 a oidi inmhain.

A form of confession arranged under the several vices. Ends abruptly with 21 *v*^o a. In the lower margin there is a note—

Aeso sa duilleog an cuid eile don raed so tshuas an duilleog beg aderim :
but the 'small folio' referred to seems to have been lost.

f. 21 [73] *v*^o b—Is iad so na se cuingill dec dlighis an faidhsi [sic] do beith innti.

A treatise on Confession, of which there are other copies in the Rennes ms. (see Rev. Celt., xv. 83), and T.C.D. 1699. Ends—
muna fedarum do beith agad.

f. 22 [74] *v*^o a—IS se in teg crich beatha gacha aenduire.

A form of service for the dying, with questions and responses between priest and sick man. Ends—

dobidh 7 ata 7 bias tre bithubh sir.

f. 23 [—] *v*^o b.

Here follows a note :—

Seaan ua Concubair docuir na becan sa a nGædhilg 7 Donnchadh ua Mælconuirí dosgribh a Lis Aedhain a Ciarraighe Airdi a tigh Ruaighrighi ui Uiginn le deifir moir 7 ailim trocuire o Crist.

f. 23 [—] *v*^o b—Da airtical deg in creidme.

Twelve articles of faith are enumerated. Ends—
do maith no d'ule amail tuillfead siad fodeoidh.

f. 23 [—] *v*^o a—Ar n-eiseirgi Crist.

Of Christ's Resurrection ; of the glory of Heaven ; of the sojourn in Hell. Ends—

gurub e rig-ruathur rig na run 7 na reltann ar n-eiridh a heg 7 a hadlucad conuigi sin.

f. 24 [75] *v*^o b—Feachtus do Moling oc ernaidhti ina eaclais.

This story of St. M ling has been edited by Stokes, Goidelica, p. 179. Ends with a note by the scribe—

Finid a[men] don sgelsin 7 is ole in meamram 7 ataim si toirsech.

In a vacant space below is written, apparently in a later hand—
Fechuin glesa pind and so o Chairbre chorrach (*or* Choirec?).

The second column of 24 *v*^o is occupied with Latin prayers, written in a later hand, with many contractions.

f. 25 [76] *v*^o a—Bai Eocha Muimbedain i ndunad a erich Connacht.

How the Kingdom of Ireland was promised to Niall Noigiallach. The story is more fully told in the Book of Ballymote, 265^b. Ends—
is se Niall acalladh reimibh ar is do darad dia. fñit.

f. 25 [76] *v*^o a—IS [coir] a fhis tra conid foichlidhi do each oen in dal derb.

A certain monk was led by a beast to a city whose ruler lay dying, while Satan (with an *al treflaclach*) waited at his bedside for his soul. As a contrast to this, the monk is afterwards shown the happy end of a virtuous man. Ends—

ar is o gnimaibh thogus Dia neoch.

f. 25 [76] *v*^o a—Dorinne Dia talumh do Adhumh 7 do Eua.

How Adam and Eve, after their expulsion from Paradise, agree to do penance, Adam standing in the river Orthanan, Eve in the Tiber. There is another copy of this piece in YBL. 158^a 34 (facs. 3): cf. *Saltair na Rann*, 1585 *sq.* It has been translated by A. A. Anderson, *Rev. Celt.*, 24, 243. Ends abruptly with f. 25.

f. 26 [77] *v*^o a—Boi Flidais bean Oilella find i erich Ciaraidhi.

This text of the *Tain Bo Flidaise* agrees with the Egerton text, edited in *Irische Texte*, ii, 2, 208.

f. 26 [77] *v*^o b—Doluigh Colum Cille feacht naill 7 Baithin do Ard Macha.

Baithin asks Colum Cille one day how St. Patrick's fame will stand in the future. Colum Cille, in reply, tells him how on the Day of Judgment Patrick will march with all those who have paid him due honour to Mount Olivet, and will insist on bringing them all into Heaven after him. The tense changes to the present, and the situation is dramatically treated. First Ailbe goes to parley with Christ, who is unwilling to admit Patrick's claim, and wishes to compromise by admitting two-thirds only of his following. But Patrick holds firm. Colum Cille, Ciaran, and Cainnech go on a second embassy, and finally by dint of appeals to old promises Christ is obliged to give way. The language of this piece is comparatively early Middle-Irish, though considerably corrupted. Ends—

oir is do nimh dosroirbead in sgel no innisim dib.

f. 26 [77] *v*^o b—Iacob 7 Iasau da mac Abraham.

Of the sojourn of the Israelites in Egypt; of the Exodus; of Balaam. Ends—

7 Iasau mac Niuin fa toisech a ndiaidh a ndiaidh Maise.

f. 27 [78] *r^o a*—Boand ben Neachtain mic Labrada dodeachaid do coimed in topuir.

How Boand was drowned: cf. *Rev. Celt.*, xv. 315. Ends—

Diata Bound Broga Breg
brises each fál co findler,
ar ba Boand ainm fri lá
mná Nechtain mic Labradha.

f. 27 [78] *r^o a*—Feachtus do Colum Cille ina regles.

How Colum Cille spent the three years preceding his death.
Ends—

ar in lar lom vero no codlad Colum Cille 7 cercaill cloichi fono cinn.

f. 27 [78] *r^o b*—Bæ Fingen mac Luchta aideche Samna i Druim Fingin.

For an analysis of this piece, see O'Curry's *Manners and Customs*, iii. 201. Ends—

in faigebsa in fogne foglas sin cen reacht rig fair for cond.

f. 28 [79] *r^o a*—Boi ri amra for Eirind .i. Eochaid Mugmeadon.

Of the birth of Eochaid; of his desertion by his mother, Cairend; how he was reared by Torna, &c.: cf. *BB.* 265; *YBL.* 188. Ends—
fosgam amassail don nainech dabaill 7 fergal folt garb.

f. 28 [79] *v^o a*—Dies ergo solempnis.

A homily on Christmas Day, and the various events that have happened and will happen thereon. Ends—

eun aitreabam and oentaig in secula seculorum amen.

f. 29 [80] *r^o a*—Sgel lem duib.

A copy of the poem edited by K. Meyer, *Songs of Summer and Winter*. Here follows this note—

IS e so dobu slan don tigerna an bliadhain doscribadh an cairt so. 1435.

O'Curry, *Lect.* 531, seems to have read this date 1437; at *Lect.* 76 (*note*) it is given as 1434.

f. 29 [80] *r^o a*—Patraice didiu mac Calpruind.

A Life of St. Patrick, of which there is another copy at *LBr.* 24^b 53. Ends—

athair 7 mac 7 spirit noem alem trocairi mic De.

f. 30 [81] *v*^o a—Bai ingreim mor.

Martyrdom of St. Andrew. Another version of the same text will be found at LBr. 178^b. Ends—

co aichnius na firinne hi patras [parrtus].

f. 31 [82] *v*^o b—Pais Pilip annso.

The martyrdom of St. Philip. Another version of the same text at LBr. 179^b. Ends—

conidhi sin pais Pilip espul conuigi sin.

f. 31 [82] *v*^o a—Pais Parrtholoin apstail so sis.

The martyrdom of St. Bartholomew. Another version of the same text at LBr. 175^b. Ends abruptly with fol. 31.

Here four folios seem to be missing, as the old numeration passes from 82 to 87.

f. 32 [87] *v*^o a—craidhi trocar eumachtmor.

A Life of St. John the Divine (*Eóin Bruinne*), of which the beginning is lost. Ends 32 *v*^o a (13 lines from bottom)—

curubi sin beatha Eóin bruinne gonuigi sin 7 gach oen sgríbhús 7 leigfís hí, maitheamb a peccadh o diadh dho 7 bas maith da tharthail gan tubaisde 7 a shéradh ar imdergadh séghulta do thoil Eóin anti qui uibit ag ræghnas [æc regnat ?] deus per omnia secula seculorum amen. Et ise Iudhisín mag Raighín cananach o Oilen na Næmh dotharraing o laidín gu gæghilg an beatha sa Eóin bruinni 7 tabradh gach neach leighfeas hí beannacht for a anmain an cananaidh sin.

f. 32 [87] *v*^o a—Foirsium misi a duileambain.

Extracts (?) from another Life of St. John: tells how he drank a cup of poison, and was none the worse, &c. Ends—

Geimhuin annti Crist 7 beatha Eoin bruinne conuigi sin.

f. 33 [88] *v*^o b—Bai rig ainghi edtrochair.

Of the death of John the Baptist: cf. LBr. 187^b. Ends—

diceannadh Eoin baisdi conuigi sin.

f. 34 [89] *v*^o a—Betha Elexius so sís.

The Life of St. Alexius. There is a copy of this Life in Trin. Coll., Dub., 1325, p. 607. Ends—

gurubi sin beatha Elexius 7 rl.

f. 35 [90] *r*^o b—Gluais na paidre so sis.

A homily on the Lord's Prayer. Ends—
ar pecthaibh 7 ar pheannuid noch ata anois ac teacht.

f. 36 [91] *r*^o b—Ac so na seacht paidreacha tue Feargal angeaire do nimh.

The seven prayers of Fergal. Ends—
an aigid ficha 7 feirgi an tigerna 7 rl.

f. 36 [91] *v*^o a—Dia na na euc osnadh so.

Of the "five sighs" we ought to vent over our sins. Ends—
co fadann se maithimh na peacadh.

f. 36 [91] *v*^o a—Amuil adeir Seneca.

Several saws from Seneca. Ends—
blaidh lomnacht ach mar dobi an feannog 7 rl.
"he shall be as bare as the scaldcrow."

f. 36 [91] *v*^o a—Adeir Augusdin næmh gebe neach eisdfeas aitfrinn o tosach
co deireth.

Of the fourteen benefits of the Mass. Ends—
maith fithar duitt iad 7 rl.

f. 36 [91] *v*^o b—Cia ceana roforan aithrighi do denumh.

Short discourse on Penitence. Ends with folio 37—
aithrighi leasg no mall .i. gan a denumh 7 rl.

f. 37 [92] *r*^o a—B[r]iath annso a Thomas de Quino.

Quotations from St. Thomas Aquinas. Ends—
co rabar faritsa a Isa a tigerna amen.

f. 37 [92] *r*^o —Domine ne in fur[or]e.

Notes on certain psalms (five lines).

f. 37 [92] *r*^o a—Cleirech do muinntir Fernai.

How St. Brigid told a *mac cleirig*, while he was at table, of the death of his confessor, and made him leave his food and find another before he ate or drank again. Ends—

ante bias amlaid 7 rl.

f. 37 [92] *r*^o a—Dunchadh ua Briain .i. camharba Ciarain.

Two stories about Dunchadh ua Briain (*recte* ua Bráin): another copy has been printed by K. Meyer, ZCP. iii. 35. Ends—
mar duncadh.h, mbriain 7 relicha.

f. 37 [92] *v*^o b—Laa dia ndechaid Diarmuid mac Cearbuill.

How a man at the fair of Tailtiu lost his head for swearing falsely through the might of St. Ciaran. Ends—

corub d'ingantaib oenaigh 7 do mirbuilib laimhe Ciarain do tabairt aneithech dosgribadh an scel sin.

f. 37 [92] *v*^o a—Laa naen robai mac Coisi for bru Lacha Lebind.

How Mac Coisi found a woman of vast size weeping for her first love; how King Cormac dug a grave to bury a monk, and came upon the body of the woman's giant lover. Ends—

tochailter an fert dorissi 7 ni frith ann an corp 7 ni fes a sgela iarum.

f. 37 [92] *v*^o a—Feacht nann do luid Aedh Oirdnidhi.

How Aed Ordnode lost his drinking-horn near Assaroe, and would drink out of no other cup, until Angal, King of Corcatri, supplied its place with one of the "three best horns in Erin." See Ériu ii. 186. Ends—

eo tuc side do Dia 7 do Ciaran a coiteinne co brath.

f. 37 [92] *v*^o b—Righ rogabh an domhan feacht naill .i. Consantín.

Of the healing of Constantine: cf. ZCP. iii. 227.

VOLUME II.

The old pagination indicates that a folio has been lost from the beginning of this volume. That which now stands first is almost entirely illegible on the *recto*.

f. 1, *r*^o a.

At line 13 occurs in red ink the date *anno domini 1440*; line 30 begins *an ifrinn*, so the subject is religious.

Line 32,

Seirg.

Line 39,

IN aimsir Slaine .i. Blathmac 7 Diarmaid.

Line 50,

Cairigh.

In column *b* 4 the words *docum aroile cleirid* are distinguishable, so the subject is religious.

Of the next three paragraphs little more than the red initials can be deciphered.

f. 1 *r*^o b.

Line 35,

Tri leigis.

f. 1 *r*^o b, 40—M

The *verso* of fol. 1 begins with the words *con(?)gleas na heaglaisi*, so the subject of this piece is religious.

f. 1 *v*^o a, 20—Tri hadb.

A note in four lines, illegible.

f. 1 *v*^o a, 25—Is e Michel.

In praise of the Archangel Michael. The piece is repeated at f. 34 *v*^o b.

f. 1 *v*^o b—Aon do læthib daulacha.

This appears to be a story about Cuchulainn and Emer. At line 24 can be read *le coinculaind Et tuc se leis emer aris arachula da tigh 7 asbert na rainn beca so and sin*. Here follows a poem beginning—

A Emir nirsam runa.

and ending—

Tang[am]ar durus tar lear
o dun monaid na milead
do marb[sa]mar tfear annsin
ac seo a ceann a emir.

‘We came on a journey over the sea from Dun Monaid of the soldiers: we slew thy husband there: here is his head, O Emer!’

f. 1 *v*^o b, 34—Pater noster.

A copy of the Lord’s Prayer interspersed with Irish sentences.

In the lower margin of the page,

cobsaidecht iar nudmaille aene iar craes deidinntinn iar formad, &c.,

'steadfastness after wavering, fasting after gluttony, goodwill after envy,' &c.

f. 2 [3] *r*^o a—Jacob mac Ioseb gabar na oileamain.

A long account of the birth and upbringing of the Virgin, of the Annunciation, and so forth to the birth of Christ, ending with an account of the birth of Christ as told by the Virgin to Simeon. Ends—

Et eridim uile gach ni aderid bar Simeon.

f. 6 [7] *v*^o a—Pais Sansalmus ata annso.

A holy man called Sansalmus¹ prays to the Virgin to relate to him the Passion of her Son: at last she appears to him and tells him she cannot do so because she is not allowed to weep. However, Sansalmus gets the story from her by question and answer: the betrayal by Judas (6 *v*^o b), the trial (7 *r*^o b), the robe and crown of thorns (8 *r*^o a). Here is added a commentary which indicates the French origin of the piece: *Et ata in coroin seo ag righ Frange 7 ni do crann spine he acht do sibhmibh mara fhasus ar dumhchaib gainimh bis laimh re muir 7 ataitt ranna 7 puinge gera acu is geiri na spine.* 'And this crown is in possession of the King of the Franks, and it is not made of a thorn-tree, but of sea-reeds [sea-holly?] that grow on the sandhills by the sea-side, that have spikes (leg. *reanna*) and sharp points, sharper than thorns.' Then follows the descent into hell (9 *r*^o a), the burial (9 *r*^o b), and the punishment that overtook the Jews. Ends—

cu teann toirirseach ara phais ceana.

f. 9 *v*^o a—Betha Iuliana.

The Life of St. Juliana of Nicomedia as in the Acta Sanctorum, Feb. 16, tom. ii., 873. Ends—

7 aduadar aiteagha 7 enlaithi 7 piasda a corp iarna chur do thuinn forsin traecht tre breithir na hoigi i. iuliana,

'and swine (?) and birds and beasts devoured his body when the waves washed it ashore, according to the word of the maiden.'

¹ As the Rev. Dr. E. Hogan points out to me, St. Anselm, Archbishop of Canterbury, is no doubt meant. He was noted for his devotion to the Virgin. See Alban Butler, *Lives of the Fathers, &c.*, i. 497 (Dublin, 1833): cf. *Anselmi Opera*, ed. Gerberon, 278, col. 1, d.

Is *aiteagha* here the plural of *aithech*, 'a sow' (*v. Meyer*, Contributions)? Or is it put for *eitechda*, 'winged things'? The Latin has merely *ab auibus et feris* (Act. SS., Feb. tom. ii., p. 877b).

f. 10 *v*^o a—*La nœn dar fiarfaidh [] ciahe ineach doberadh uisce dom ceann 7 brœn dom suilib,*

'One day when — asked, Who shall give me water for my head, and tears for my eyes?'

A holy man (unnamed) urges the Virgin to describe her Son's Passion: she answers, as in the *Pais Sansalmus* above, that she is not allowed to lament, but proceeds nevertheless to narrate to him the incidents of the Passion and Crucifixion. Compare the legend in LBr. 280 b. The end of the piece will be found at fol. 25, which is misplaced. The last words are (25 *r*^o b)—

7 on failti ainglighidhi dobhi ag tathaighi chucum.

f. 25 [14] *r*^o b—*Dobaidh muinte uasul feacht naill annsan Almainde.*

There lived in Germany nine brothers, the youngest of whom was St. Albertus. While offering Mass one day, he demands to be told what he can do to earn the gratitude of God, declaring that he will neither raise the Host nor set it down until he gets an answer. Whereupon he is told of the eight things most profitable to all that desire eternal life; and is also exhorted to say fifteen *paidreacha* every day. A homily in fifteen heads is cut short by the loss of the next folio.

f. 13 [15] *r*^o a—*Quoniam ut ait beatus Augusdinus in libro de fide.*

A dialogue between a Priest and a Voice, which describes to him the life to come. Ends—

ni fuil a fis agum cadh aderuinn rit d' ordochadh flaitheamnuis De.

f. 14 [16] *v*^o b—*Grasa abus 7 gloir thall o Dia trocaireach cunn Magnuis mic Mathamhna,*

'Grace in this world, and glory in the next, from the merciful God to Manus son of Mahon.'

After apologies for his defects, the writer discourses on the duties and responsibilities of the priesthood. Ends—

madh ail lib trocairi 7 beatha suthain da fagbail o Dia cui laus 7 onar 7 gloria per infinita seculorum amen, &c.

f. 17 [19] *v*^o b—Betha Ceallaigh naimh so sis.

A copy of the Life of St. Cellach, edited by O'Grady, *Silva Gadelica*, i. 49. Ends, 20 *v*^o a [22] = SG. i. 64, 20)—

Adconnarc aislingid ole.
 muc[a] mic Colmain domolt [dom lot]:
 bidh ole duinne anni bias de
 da fir tra an aislingi.

f. 20 [22] *v*^o b—[N]uimhir na seacht neimhe ataid guruigi in righththeadh annso.

Of the seven heavens and their seven doors. Ends with f. 20—
 as na se srothuib fuil anifirn 7 asiadso a n-anmanna sin. aceron coticus
asericus stix flegiton mannog.

f. 21 *r*^o a—[IS] ann dorighnidh dia an t-oibriugad se laithi.

Of Lucifer's refusal to pay honour to Adam = LBr. 109^b50 to 111^b34. Ends—

Dimus an aingil 7 innarbadh Adháimh as Pardus conuigi seo.

f. 21 [23] *v*^o a—IS he Crist mac de bí.

On the eight unprofitable kinds of fasting. Also in LBr. 258^a 10; cf Rev. Celt. xx. 22. Ends—

IS iad so tratha buadha na haine 7 is imdha buadha na n-egmuis so mugenur doní co coir hi amlaidh sin.

f. 22 [24] *r*^o a—IS e ní ata annso .i. forus 7 dlige anmceardeasa fear nEirenn.

Of the evils coming on Ireland for neglect of Confession. Also in LBr. 258^b18. Ends—

7 iteidh Padraig forsan duileamain 7 athnumh creidmhe do beith ac na dainibh annsin.

f. 22 [24] *v*^o a—Beati qui persecutionem ponuntur [patiuntur].

Ends—

tria impighi Poil 7 Petuir co sisam 7 co soithim neamh.

Ed. Atkinson PH. 86-95.

f. 24 [26] *v*^o b—Do bun-genelachaibh na napstal 7 da naigheadhaibh.

Ed. Stokes, RC. viii. 362? Ends with f. 24—

Tadetus do treib Dan do.

f. 25—See above, before f. 13.

f. 26 *v*^o a—IS a nãmhadh bliadhan deg.

This account of the Passion, Crucifixion, &c., is found also in YBL., faes. 141–154. Ends—

gurubi sdair nicomett ara pais conuigi sin.

f. 32 [42] *v*^o a—Dia luain laithi in measraidhthi.

Eight quatrains on Day of Judgment, followed by a description in prose of the punishment of the different classes of evil-doers. Ends—

as dogh as losgadh as ard as iseall is rofuar as rotheigh is cumaing.

f. 33 [43] *v*^o b—Na cuig paidreacha so sis ar son na cuig ndubalta fuair Muire.

On the Five Sorrows of Mary, and the powers given to her in compensation therefor. Ends—

condearna tusa trocuire air do reir (?) do thoile fein.

f. 33 [43] *v*^o a—Cuice t̄soblais fuair Muire a talumh.

On the Five Joys of Mary. Ends—

do gobail le gach soblais dibsin.

f. 33 [43]—Sagart maith uasal onorach.

See Ériu ii. 82.

Dr. Whitley Stokes informs me that there is a somewhat similar story entitled *De apibus quæ basilicam corpori Dominico fabricaverunt*, printed in the *Dialogus Miraculorum* of Cæsarius Heisterbacensis, ed. Strange, Coloniae, 1851, vol. ii., p. 172.

Ends—

doerididar moran dona dainib do annsin.

f. 33 [43] *v*^o a—Baithin mac Breanainn mic Feargusa.

A story of St. Baethin, edited by K. Meyer in *Gaelic Journal*, vol. iv. 229, from two mss. Ends—

ba heagnaigh amhra he gu demhin.

f. 33 [43] *v*^o b—Cadde in tadbhar fa dug Dia easbaid do Maisi mac Amra.

Why Moses was dumb? To save him from Satan's sin of pride.

How the Children of Israel met Nel and Gaedel Glas at Paciroth, and how Gaedel Glas was cured by Moses and Aaron of a serpent's bite : cf. LBr. 119 a 24. Ends—

7 is do mirbuilbh Aron 7 Maisi [do] ronnadhsin co deimhin.

f. 33 [43] *v*^o b^x—Tri cuisi ara ndliginn neach deimbrigh (?) in tsæghuil .i. ar med as sæthair aga iarraidh 7 ar met a deithide aga coimeth 7 ar met a toirsidh (?) fa na dul uadha.

‘Three reasons why men should contemn wealth, viz. for the amount of labour in getting, of care in keeping, and of grief at losing it.’

f. 34 [45] *r*^o a—Ceasc[e]aidi cet costadh ecailse De iar peatarlaich.

Of the beginnings of the Church in the Old Testament. How Christ took on himself the nine ecclesiastical degrees :—*liatreoir é on uair do leigh se leobur Maeisi*, &c. So he became successively *aistreoir*, *exorcista*, *subdeochain*, *deochain*, *sagart*, *eascop*. Ends—

7 do beannaidh se iad annsin.

f. 34 [45] *r*^o b—IS e seo trath uidi beiris an t-anum as péin, ‘This is the journey (?) that brings the soul out of torture.’

Of the *Beati* (Psalm cxix.). Ends—

7 ata an aipiteir eabhraighi co comhslan furri, ‘and it comprises the Hebrew alphabet in full.’

f. 34 [45] *r*^o b—Biaid do gobail co minice.

Poem on Ps. cxix. in seventeen stanzas. Ends—

ba do caingnibh biaide.

f. 34 [45] *r*^o b—Feacht nœn dia mbai mac Taidhg mic Toirrdhealbhaidh ui Briain a mbraidinus.

The first part of the story is partly obliterated ; but it seems that Mac Taidg was made prisoner by the King of Munster with Turehail *righ Gall* and Nenne, Archbishop of Ireland. In captivity Mac Taidg appeals for help to the Devil, who is anxious to assist ; but Colum Cille interferes. “He is my especial monk and nobody else’s : for he has by heart my Amra and its interpretation.” The Devil comes to Mac Taidg, and explains that under these circumstances he can do nothing to help him, “because the Amra of Colum Cille is

between us"; thereupon the Devil breathes on Mac Taidg—*condernaidse lobur maelderg clamh de*—whereupon Mac Taidg is let out of prison, and is known as the Leper of Lismore. Ends—

Ni he an diabul fodearasin d' faghbhail do acht guidhi Colum Cille 7^{cc}.

f. 34 [45] *v*^o a—ITE annso imorro suighiughad sunnrudhach tighi Solaim mic Dauid.

On the ordering of Solomon's House.

Copies in LBr. 130^b; YBL. 419^a: printed Todd Lect. 8, 73. Ends—

da xx mile each for nach ceimnighidis carbaid.

f. 34 [45] *v*^o a—INCipit epistola Dei.

Another copy in LBr. 202. Ends on slip to right:

flaithemnus neimte cin foirchinn 7 do hordaiged (?) a beth for *gach* altoir 7 in secula seculorum.

f. 34 [45] *v*^o b (slip to right)—IS e Michel.

Praise of the Archangel Michael: cf. fol. 1 *v*^o a 25. Ends at bottom of fol.—

abcolipsi.

f. 35 [44] *r*^o a—Airdri in domhuin is treisi na gach ri.

A copy of the Tenga Bithnua. See Stokes, Ériu ii. 96. Ends—
.i. tir na soillsigh suthuine.

f. 37 [46] *r*^o b—Agallaib an cuirp 7 na hanma.

Dialogue between the Body and the Soul: cf. LBr. 251 β 38, ed. Atkinson, PH. p. 266. Ends—

cu subach sobronach annsa flaithus ar nach fuil erich na foireinn.

f. 38 [47] *v*^o b—Aisling poil do phianaibh iffirn.

Vissio Pauli de penis inferni.

Of Paul's visit to Hell in company with the Archangel Michael, and of the sights he saw. Imperfect.

Here one or more folios are missing.

f. 39 [—] *r*^o a—IN umhla is da hingheanuibh annso.

A homily on the virtues of humility, patience, truth, &c. Ends—
7 freitach re flaitheamhnus na nœm he.

f. 39 *r*^o b—Nuimhir beg do sgelaibh cuirp Crist annso síis.

A homily on the Sacrament of the Mass. Ends—
7 cuir locherand ar lasadh annsa croidhi mar aithrighidh.

f. 40 [51] *r*^o b—Deich mirbuile 7 .x. cumachta cuirp Crist annso.

Homily on the power of the Sacrament. Ends—
gingu faicear ina cosmailius fein iad cudighluis.

f. 40 [51] *v*^o a—Do suighduighadh cathrach Iarusalem.

A description of the New Jerusalem: another copy in YBL. facs. 169^a. Ends—

Isann lo cetna dosgail mac De na heasbuil fon cruinne.

f. 40 [51] *v*^o b—IS cubhaidh an t-ord forceaduil ro ordaigh an primh phaidh toghaidhe .i. Daniel MacOdhbha.

Of the angelic orders: another copy in YBL. facs. 169^b. Ends—

is tritsin do leighis se each osin aleigh.

f. 41 [] *r*^o b—Cease cia lasa a tugadh na hildatha examla ut docither isin cohall aifrinn.

On the meaning of the colours in the Mass-vestments. Ed. Stokes, V. Trip. clxxxvii. from LBr. 108^a. Ends—

gan crich gan foirceann air.

f. 41 [] *v*^o a—Araile aimser da roibe cele De ann.

How a little boy was carrying firewood on a Sunday, and how the wood caught fire and burnt him to death. This and the two following stories are printed by K. Meyer in ZCP. iii. 228. Ends—

is baidh an macamh gan anmain.

f. 41 [] *v*^o a—Buidh sruith ele feacht naill *dano* inarraigheil.

How a recluse was fed daily by an angel until he broke the Sabbath by clearing a chip[?] out of his path: whereupon the angelic visits ceased. Ends—

nirbo dreamhna do in t-athbreath.

f. 41 [] *v*^o a—Bui *dano* feacht naill popbul a timcheall railgi dia domnaidh.

How an Irish pilgrim drove cows out of a vineyard on a Sunday, and how three waves came and made an end of him. Ends—

comdar loma a enamha de.

f. 41 [] *v*^o a—Eustasius næmh dar ainm ar tus Placidus.

A Life of St. Eustathius. See Act. SS., September, vol. vi., p. 123. There is another copy in the Academy's collection, 23 O. 4, p. 16. The legend tells how Placidus (this was Eustathius' original name) went hunting and followed a deer which had a cross between its horns. Christ speaks to him from the beast's mouth. He believes, and is baptised as Eustathius, his wife as Theospita. Christ again appears to him in the same form, and asks whether he would rather face his trials now or later. He chooses the present. His servants and stock die: his house is robbed. He goes off with his family to the sea, and embarks on a ship. The captain tries to kill him in order to take his wife; but he escapes with two children. They are carried off by wild beasts, but rescued by the natives. He is reunited to his wife and family, but is finally martyred for refusing to offer sacrifice to idols. Ends—

12 kalaind do mi October.

f. 43 [] *v*^o a—Muire eidheipteach noch dobi na bainpeccaidh ar tus.

A Life of St. Mary of Egypt. For the legend see Act. SS. Boll., Apr. 2, vol. i., 76). Here the story begins with Zosimas meeting Mary by the Jordan, stark naked: he clothes her, and she tells her story. He then administers the last Sacrament to her and she dies. There is another Irish version in the Library of Trinity College, H. 1. 17, p. 35. Ends—

docuaid an seanoir cum a mainisdreach fein 7 tue gloir do Diadh.

The *verso* of fol. 43 is partly obliterated.

f. 43 [] *v*^o a—Caste viventes apostolus esse.

Apparently a dialogue between St. Jerome and a monk in praise of chastity. Imperfect.

Here one or more folios are probably lost.

f. 44 [] *v*^o a—Feacht næn dar gab Dacianus [im]pir flaitheambnus.

A Life of St. George. Edited by Atkinson, Passions and Homilies, p. 71. Ends—

dogab baistead 7 breitheamnus a n-ainm an Athur 7 in Mic 7 in Spirud Næimh Tui est hora (*sic*) et gloria [in secula] sæculorum. Amen.

f. 48 [99] *r*^o a—Timna Muire so sis, [A]roile la 7 amsir dia roibi nãm Muiri mathair an Coimheadh ac sirgabail a salm.

The Testament of the Virgin. How Christ appears to her to tell her that her death is near, and gives her a palm (*failm*) to which trees bow, etc. He tells her the legend of the palm. On his departure the Virgin summons her friends (48 *v*^o a), and asks John to protect her body from the Jews (48 *v*^o b). The other apostles assemble: Peter and Paul (49 *r*^o a) lead in prayer. John the Beloved comes and tells how he had been miraculously conducted to the Virgin's house. While Paul and the other Apostles are discussing the true doctrine, Christ appears amid clouds, and promises a revelation to Paul; but first he and Peter must fight the Devil, for, says Christ, I promised I would bring no man to Heaven except he should have won a battle against the Devil. The two Apostles are victorious. The Virgin dies (49 *r*^o b), and Peter and Paul are allowed to see the angels carrying off her soul. The attempts of the Jews on her body are miraculously thwarted (50 *r*^o a). The two Apostles are taken to see Hell; and the Virgin, in her new state, accompanies them. In her honour, the damned are allowed three hours' grace every Sunday. Ends—

do sgaileadh breithre De tar eis Muiri dfagfail ag Issu.

f. 50 *v*^o a []—eir Brenuinn Birre ata so.

Batur tra da easbul deg na Heirinn i Cluain Idhaird aga fogluim ac Finnen.

Finnen of Cluain Irard made a feast for the Apostle and Saints of Erin. They see in *sgoith ndicra ndimor* coming to them as a sign of the Land of Promise. They draw lots to determine which of them shall go to find where it comes from; and the lot falls on Brendan of Birr. But as he is the oldest of all, Brendan, son of Finnlug, takes his place, being the youngest present. He sets out across the sea: the passage that follows answers to that in the Life of Brendan, published by Stokes from the Book of Lismore, p. 107, *Seolais*, down to line 3665. At this point Brendan hears a cry and sees, on a rock surrounded by waves of fire, Judas Iscariot, who recites a poem beginning

Hiudas Sgario me aniumh.

With this the piece ends.

f. 51 [102] *r*^o b—Bai Aillelt 7 Meadb aidce samna cona teglach uile.

Part of *Echtra Nerai*, ed. K. Meyer, RC. x. 212. Incomplete, breaking off with the words—

cinnus berudsa an fis sin don muintir ol Nera eirigh.

f. 51 [102] *v*^o a—T . . . ti na nDeisi do Moidh Breadh.

An incomplete copy of the tract on the Expulsion of the Dessi, contained in Laud 610. See K. Meyer in *Y Cymmrodor* xiv., pp. 104–112. Ends—

IS si iarum dobert Cormac ua Cuinn breic in dunad cenguil in righ .i. granne 7 mænne diata mænrihi de.

f. 51 [102] *v*^o b—Ceithri primhcana Eirenn .i. caine Daire 7 cain Padruice 7 cain Odonan 7 cain in domhnaidh.

A note on the Four Canons of Erin: cf. vol. i., 12 *v*^o b.

f. 52 [105] *r*^o 1.

The folio begins with the title *eir crochudh Crist ata so*. Just below is written [*f*] *uair bas // finid //*. These are evidently the last words of a piece occupying one or more folios now lost. The title refers to the following tale.

f. 52 [105] *r*^o a—[B]aidh dail mor la hUlltu a muigh Muirrthuini.

How Conchobar mac Nessa heard the story of the Crucifixion. A composite version of the legend. See O'Curry, Lect. 277. Ends—

co tue Crist anim Concaba[ir] . . . docum neimhi.

f. 52 [105] *r*^o b—Ceithri hairdi an domuin.

Of Fintan mac Laimfiach, Feren mac Sistian, Foris mac Elechtra and Andoit mac Ethoir. Ends—

is iadsin trath nceathrur rocoimed seanchus an beatha a coideinni (?)

f. 52 [105] *r*^o b—Dosmuain in diabul da faghadh se.

How the Devil married *an ecoir* ('Wrong'), and of their nine daughters, Simony, Hypocrisy, Violence, Usury, Fraud, Sacrilege (*goid ar in eaglais*), False Humility, Pride, Lust: these marry respectively the Clergy, Friars, Knights, Burgesses, Merchants, Farmers, Servants, Lords—and Lust, Everyman. Ends—

acht dona huilibh.

f. 52 [105] *r*^o b—Na deith naithneamhadso sis.

Homily on the Ten Commandments: edited by Atkinson, *Passions and Homilies*, p. 245. Partly illegible.

f. 55 []^{ro} b—Bai Brenainn mac Finnlogha i nDub[daire].

Nearly illegible; but the beginning shows it to be the story of St. Brendan and Dobarchu edited by O'Grady, *Mélusine*, iv., col. 298 (see Stokes' *Lives of the Saints from the Book of Lismore*, p. xvii).

Ends—

ceill eirid is creid . . .

f. 55 []^{ro} b—Feachtus do Moling 'e earnaidti.

This tale, which is nearly obliterated, is apparently the same as that contained in H. 2. 17, p. 398 (T.C.D.).

The *verso* of this folio is quite obliterated.



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III.

EARLY IRON SWORD FOUND IN IRELAND.

BY GEORGE COFFEY.

Read FEBRUARY 12. Ordered for Publication FEBRUARY 15.

Published FEBRUARY 24, 1906.

AMONGST the objects of iron found during the Shannon Navigation Works, 1843-48, and presented by the Shannon Commissioners to the Academy, an iron sword (figure 1) is of much interest. It is of the Halstatt class, and is, I believe, the only iron example of that class which has been found in Ireland. A label attached to the sword states that it was "taken up in the buckets of the 'C' dredger" out of the bed of the Shannon above the new bridge of Athlone, August, 1847. It is incomplete, and has lost much of its substance from rust, especially along the edges. The form, however, can be distinguished. It is made on the pattern of the leaf-shaped bronze sword. The width of the blade increases towards the point, and the handle-plate was of the flat form of the bronze swords. This latter feature is certain, and is the most definite in the specimen. The edge of the handle-plate is intact for a short length at the right side; and the remains of a rivet-hole can be seen on the expanded portion at the hilt. The curve in the blade does not appear to be intentional, but to be due to a bend it has received about one-third up; the line of the ridge is straight to and beyond the bend. This ridge along the centre of the blade is not a very usual feature; but it occurs occasionally on the bronze swords, and on an iron Halstatt sword found in Poitou, figured by the Abbé H. Breuil (*Revue Archéologique*, 1903, II., p. 57).

This latter sword was found at Mignaloux-Beauvoir, near Poitiers, in 1836, but had remained unnoticed in the Museum at Poitiers until the paper mentioned. It measures in its present state 45 cm. The Irish fragment is $18\frac{1}{2}$ inches long (47 cm.); so the two swords were much of the same length.

A fairly large number of the bronze swords of the Halstatt type have been found in Ireland. There are twenty in the collection, and six of the winged chaps or scabbard ends of that period.



FIG. 1.—Iron sword found in the Shannon.

The occurrence in Ireland of the type in iron is therefore of considerable interest. The somewhat slender look of the sword and the ridge disposes me to regard it as late in the series; it must, however, rank as probably the earliest type of the iron sword which has been found in this country.

The early iron sword with flat handle-plate had been found in considerable numbers east and south of Poitou in Berry, Bourgogne, and in Lot. But its extension to the west had not been known till the example figured by the Abbé Breuil. It should be noted that Poitiers is close to the old line of communication between Ireland and the Continent by way of the Loire valley.

Illness has prevented me from placing before the Academy the archæological evidence I have collected bearing on the question of early intercourse between Gaul and Ireland; but I should like to state as a preliminary note, that certain forms of bronze caldrons and types of pottery at the close of the Bronze Age, also of types of iron spear-heads and other objects of the La Tène period, may be advanced in support of the historical tradition in our tales of a settlement of Gauls in Leinster under Labraidh Loingsech, at a date placed perhaps too early by the Four Masters (B.C. 541), and from whose "broad blue spears" the name of the province of Leinster (Laighen) is derived.



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IV.

ON THE FUNCTION OF AN ACADEMY, IN ESPECIAL OF
THE ROYAL IRISH ACADEMY.

AN ADDRESS DELIVERED TO THE ACADEMY, FEBRUARY 28, 1906.

BY ROBERT ATKINSON, LL.D., *President*.

Published MARCH 26, 1906.

It has been the custom for the President to deliver an address to the Academy during his term of office, the subject being naturally some topic relevant to the Academy and its work, its theory and its practice. It is a custom reasonable in itself, and not to be lightly set aside by any man whom the Academy has honoured with this special mark of its confidence.

The history of the early labours of the Academy has been set forth on previous occasions by men much more competent than myself to estimate and illustrate the many sides of the Academy's activity, so that though, no doubt, each different President must look at the subject from a different point of view, and estimate it with a different standard, and from a continuously increasing amount of productivity, I have not felt at liberty to re-handle this theme; and in searching for a subject on which I might hope to interest our members, I have thought that the time is not unsuitable for some general considerations as to the office subserved by an Academy, and in especial by the Royal Irish Academy. I propose, therefore, to lay before you certain thoughts which have solicited my attention for some time past, and which have finally crystallized into the following shape. It is in no spirit of dogmatism that I put them forward, but in the hope that they may prove suggestive, in however slight a degree, and in the belief that you will listen to them sympathetically, as the utterances of a man who has spent most of his life in close connexion with the Academy.

The foundation of a new Body, called the British Academy, shows that the notion expressed by the term 'Academy' is familiar to men's minds; but I am not sure that any satisfactory definition could be given of the term. It certainly is understood to mean something more than merely *Learned Society*; but so many different significations have been connected with the word in its familiar use, that, like other common terms, it has almost become indefinable.

In some cases, the etymology of a word may be found of service in throwing light upon its original and essential meaning; but this resource is not available here, for while the final syllable may be connected with *δῆμος*, the remaining portion of the word resists analysis, and is not explicable as a Greek element. Indeed, there is found another way of writing it, viz. with *ἔκα* instead of *ακα* [*Ἀκαδημία*], so that probably the prefix, whatever be its nature, was unknown to the Greeks themselves. But the application of the word to denote a garden or grove where discussions were held on philosophic subjects, has fully justified its use to signify a place for the re-union of scholars and scientific men aiming at the promotion of the interests of learning in the widest sense. It is, perhaps, best known in its connexion with France, where it has become a household word with brilliant associations and a definite connotation.

Very different judgments have been expressed from time to time with reference to the institution of such a body as an Academy. It has even been held that our modern ways of thought, and the progress of science, have given an appearance of unreality to the notion of Academy; and it has been gravely doubted whether it be not a mere form of titular distinction, an institution with no very precise function, and but little directive or stimulative efficacy. I do not share these doubts. I believe that an important service is or can be rendered by an Academy, using the term in its application to a certain definite form of *Learned Society*. In the case of our own Academy, the purpose and scope are briefly laid down and prescribed in the first page of its Charter, viz. to give encouragement to all studies that tend to the increase of useful knowledge, to persons who have met together for their mutual improvement in the studies of Science, Polite Literature, and Antiquities. It was not intended as any merely or mainly literary tribunal. It was not charged, directly or indirectly, with any duties of the nature of purifying or improving the language. Its aim was not Aesthetics, but Philosophy in the widest sense. It was to advance general knowledge, and to aid individual improvement.

But it is clear that it is by the medium of literature that this desirable result was to be brought about, that, as the Charter quaintly puts it, "useful, curious, and polite literature should continue to flourish and increase." This improvement was to be aided by the reading and publication of papers. This is, no doubt, the method the Academy has always pursued; but what is not quite so certain, is the best means of fulfilling the clearly expressed purposes held in view by the Charter.

The Academy seems the natural continuation of the University. After the studies of discipline and training come the studies of progress and discovery; but the University is not primarily constructed with a view to advance these latter departments. In a University there can be little room for independence of thought; it seeks rather for conformity; it cultivates memory, not creation. It requires that a student shall know what others have said, and it is not asked (at least not mainly) of him what *he* has discovered. The University tests whether the student knows what has been said and thought. The Academy investigates what the man asserts himself to have found out. The University enforces the mastery of the known; the Academy deals with the conquest of the unknown.

That is one of the purposes of its foundation; and the manner in which it has endeavoured to fulfil this purpose can be gathered from the study of its publications. But the other purpose is not so easily tested, and, perhaps, may be regarded as of relatively smaller importance. But if experience and tradition are to be trusted in anything, it is surely a truism that a people of Celtic descent will not be averse to speech. The Celtic philosopher, explaining the representation of the God *Ἐρμῆς*, as Lucian tells, put it thus: "We Kelts do not regard speech, *τὸν λόγον*, as *Ἑρμῆς*, as you Greeks do; but we liken him to *Ἡρακλῆς*, as being far stronger than *Ἑρμῆς*; the strongest, the wisest, the most persuasive, drawing all men bound by the ears with bonds of gold and amber";—a strongly characteristic and instructive symbolism. Of course, in the case of all papers read before the Academy the subject-matter will be estimated after the perusal at leisure of the paper when printed. But, to ensure this end, there would be no need of any meeting at all, nor of any machinery for bringing about oral discussion. Yet no reasonable person would be inclined to deny the serviceable side of Parliaments. One of the most effective means of stimulus, and the surest guarantee of knowledge, is that it should have been

submitted to discussion at the hands of competent and independent critics. The Academy was to be a Parliament; its papers were to carry the weight of the approval of the Academy, for otherwise the papers might just as well have appeared anywhere else. And as discussion tends to furnish a guarantee of value, so it tends to arouse interest in the body of the members; and perhaps this particular function of the Academy has not always been fully acknowledged and exercised. I have felt at times during my term of office that I should have been glad to hear a little more discussion; not certainly for the pleasure of listening to pungent criticisms, but for the purpose of enabling me to comprehend more fully the bearing and relations of the paper read. It is one of the clauses of the declaration made by members on entering the Academy "that we will be present at the meeting of said Academy as often as we conveniently can"; and probably there is ground for holding that if there were more discussion there would be felt a greater interest in the meetings, and an impetus and motive furnished for attendance in these busy times.

Save in papers on pure mathematics, where there can be very little discussion, it may be in general maintained that when a paper is read, it can be discussed: there is logic involved, inferences are made; there is a method adopted; there are references to other branches of knowledge in which other authorities may have a word to say; and thus there are many openings for relevant questions and suggestions.

In discussion among a large number of persons skilled in various branches of knowledge there may be expected from time to time to emerge from the clash of intellects, new modes of looking at complicated problems of general interest: attack and defence are often productive of results tending to progress. At the very least they may be held to furnish opportunities of developing the subject even to the writer of the paper, by suggesting points of view, by calling attention to possible difficulties of statement or interpretation which may have escaped the notice of the writer. But I need not labour the point, as the advantages of discussion are probably admitted, just as, on the other hand, its dangers are appreciated. The general result to be obtained by fuller discussion would be not only the arousing of a wider interest, but also the formation of appropriate links between the different branches of the Academy's work. One might be inclined almost to formulate as a maxim that every paper should involve some appeal to the general interest of human beings. In our modern life, in Science, in which such progress has been made that specialization has become

an absolute necessity, the danger is apparent that these special papers are addressed to those only who are specially trained in some very exclusive or narrow branch of knowledge, so that other students are practically left uninterested or indifferent. But this tends to split up the Academy into several distinct branches without any but the most external bond; and here the division entitled Polite Literature may naturally point to the mediating element. The section Polite Literature opens up a wide field for discussion. It deals with all art, arts of the eye and of the ear, of sculpture, of music, of painting, of poetry; it embraces a treatise on the sublime or a criticism on the style of an author. These each and all furnish abundant scope for the composition of papers with a view to interest and improvement. They attract and they instruct. One can hardly doubt that this field furnishes endless material for study; but I am disposed to fear that it is in danger of being too much lost sight of in the interests of the papers that are looked on as being in some respects the more legitimate objects of the Academy's labours. But surely the literary side is just as valuable and efficient for human improvement as the scientific, and it certainly promises to be more interesting.

And in this section one of the sides seems to me altogether ignored, viz. :—that of Polite Literature in the narrower sense—I mean the study of the works of literary art. I cannot recollect any case of a paper being read here on a poet or prose writer of English or any other language. But if the humanities belong to the Academy's sphere of action, then it can scarcely be right to ignore, or undervalue the study or interpretation of the works of literature. It is not a slight merit to understand and reveal the thought and the aim of great minds of the past or the present. It may be granted that the greater part of the world's literature has been examined and appraised, that there are very few countries whose written thoughts have not been submitted to criticism; but, then, with each epoch the criticism has to be reconsidered from a different point of view, with further light, with different sympathies and modes of thought. As a distinguished poetess* has said :—

“ What the poet writes,
He writes : mankind accepts it, if it suits,
And that's success : if not, the poem's passed
From hand to hand, and yet from hand to hand,
Until the unborn snatch it, crying out
In pity on their fathers' being so dull,—
And that's success too.”

* E. B. Browning, *Aurora Leigh*, p. 190.

Our age is one of criticism rather than of creation, so that any paper of a critical purpose is in the spirit of the time and on the lines of the Academy's modern work. And here, assuredly, there is no want of material for new and instructive essays. It is an age of education, and all education at the present time must be critical to begin with, for all teaching is concerned about the work of others; the first stages are necessarily analytical; the creation, if it comes at all, must come last. The analysis of psychology is the stock-in-trade of all writers, and this psychology is based on abundant and careful investigation. The art of writing has been elaborated by practice into a discipline that can be taught like any other manual labour, but the genius which gives life and power to a work based on this analysis and this training, is just as mysterious as ever, and as full of problems of criticism as before; and it is just this problem of *genius* that opens ever fresh ground for reconsideration and discussion. The one never-exhausted topic is to place a writer in harmony with his age and surroundings, to fit him into his locus, to account for his productivity under his circumstances. These are the ever-recurrent questions: What are the relations of genius and circumstance? What are the reactions of society on the individual? And to us of the Irish Academy what could be more interesting, more absorbing, than the investigation of the causes of the success of certain works of art in the past, and of the prospects of the success of certain others in the future? What were the peculiar elements that made such a success of MacPherson's Ossian? What makes Celtic poetry so attractive? What is Celtic glamour? What is the place and sphere of criticism in Celtic? The Academy would, I think, welcome any exhaustive exposition of the claims of Celtic as a contribution to knowledge in its department of Polite Literature.

The discussion of papers on these and kindred topics would naturally lead to the discovery and formulation of principles to be attended to in the estimation of any given literary product. And in particular the habit would be acquired of applying tests, the normal tests of modern critical judgment. A mere plebiscite is no criterion; neither is simple assertion sufficient, however loud, nor individual sympathy, however intense. There must be valid reasons, critical grounds alleged for the judgment; and these reasons can be only found in the institution of comparisons with the great masters of the art of writing. Not by comparison of individual passages, for the conditions of life differ too widely to admit of any narrow method; not by the elaboration of mechanical rules, but by the

judicious application of admitted principles. And the discovery and formulation of such principles would be pre-eminently work for the Academy to undertake.

The Academy gives complete independence to its members for the expression of their differing opinions on matters that admit of difference of opinion; but it ought not to be forgotten that independence should involve independence of *bias* as well as of *authority*, and that any hypothesis that can be found to explain the inner motives that led to the performance of admitted actions, or the critical principles that guided the composition of extant works of art, has a fair claim to be heard before being rejected or denounced, and that such rejection or denunciation must be based on grounds of reason and not of authority.

In studies of history, Irish topics will naturally claim attention from members of this Academy. Psychological analysis has shown the solidarity of Literature and circumstance. The best work of a writer is the portion which is spontaneous and inevitable in his writing; and as it discloses the writer himself in his real essence, so it also reveals the character and temperament, the mood and aims of his time. The study of any work of literature cannot fail to be a revelation of much that is characteristic of the period. Much knowledge can be gained from this study of the interactions of literature and life. Patrick, Columbanus, Adamnan, Swift, and Burke, these names are pregnant with interest and emotion; their epochs, each with its ideals and its action, seem to live again in the study of their personality.

But it is the early period that stands in need of special illumination. At present only dim ghosts flit across the stage of the mythic period. Cuchullin, Finn, Ossian, are but the phantoms of the poet's dreams.

Even of a later epoch, of which historic records are extant, there is as yet but little clear historic vision. It has been too often handled by writers in a prose-poetic style, that permitted itself the licenses supposed to be tolerable in the treatment of a legendary record: the setting was altered and the incidents idealized. But this is not the right use of legendary record. The legend may not be true, but its details are significant of the life and conduct of the period; and they can be correlated with the other circumstances of which knowledge is to hand.

But further, great service can be rendered to historic science by the limitation of subject to a definite period, and to a particular

group of incidents, for much of the unsatisfactory handling of early Irish history arises from the attempt to occupy too wide a field. Vague traditions are heaped together unsifted, and acquire a colouring from the unconscious action of the writer's personality, so that the history becomes little better than a kaleidoscope, and fails to command or deserve general acceptance, or to overcome antecedent prejudices. No doubt, history must always remain liable to this colouring, to the personal equation; but still it is certain that men will always turn with eagerness to the charms of narrative and incident provided in the abundant fields of history, whereas the dry light of science is often a cold, chill glare, distasteful or even hurtful to unfamiliar eyes.

I need scarcely add that the treatment of these records should be dispassionate. Mr. Bury's recent book, "Life of St. Patrick," is an excellent example of this kind of special study, combining the accurate sifting and weighing of the evidence with the courageous judgment of the historian. Critical work on the famous saints of Ireland would furnish many a fruitful theme for historic study: and the heroes of Irish Saga want their place in history determined by competent investigation. The early migrations to Ireland remain still a subject of rhetoric mainly, and have not yet yielded their quota of trustworthy information. The early tales are full of incident, and seem to involve matters of fact which await their identification at the hands of patient and skilled labour.

An inexhaustible field of study lies open in the early history of Ireland, through the investigation of the old Sagas of Viking age. But here there is need of very special training to enable the different sources to be readily and rightly utilised, for this training involves an accurate and extensive knowledge alike of the Celtic and of the Scandinavian languages and literatures. This would furnish an admirable field for those of our members who have leisure to bestow on antiquarian studies of this order; the Professorial body are naturally so absorbed at present in grammatical and lexicological studies that they have but little leisure available for such wider and more comprehensive investigations. One can hardly imagine a more promising theme than the relations of the Norseman and the Celt, as set forth in or deducible from extant historic records; nothing more subtly instructive than to find in their respective literatures also traces of the commingling of the bloods, as in the old Scandinavian custom of the Vikings.

Next to that of History, perhaps, is the power of Antiquarian research, which strongly attracts all men, and which should be guided by the same conditions, viz. that it be permeated with humanity, that it have a high aim, and be based on wide, accurate, and critical judgment.

And here it may be well to point out the importance of an extensive acquaintance with the foreign literature of antiquarian subjects. There are not many topics of real antiquarian interest that have not received some handling in foreign journals or treatises. Many of these have not been translated, so that an antiquarian student, to be fully furnished for his task, would require to be master of half a dozen languages, at least as far as their antiquarian vocabulary extends, including Latin, French, German, and the Scandinavian languages, without which knowledge, antiquarian study is almost necessarily limited to the sphere of merely local records.

There is a danger to which antiquarian study is liable, viz.—of looking upon its objects as of value in themselves perhaps even as much as in their relations to man, of contentedly regarding the external notice of the object as constituting an end in itself. The long and continuous handling of antiquarian record is necessary to make the antiquarian; but care should be taken that the process shall not also result in causing him to ignore the humanities of his art. No doubt the recoil from the looser speculation of an earlier period has produced this aversion from hypothetic reconstruction; but the absence of ideal treatment is never long in avenging itself. For if scientific essays are denuded of imagination, there must be a loss, in that the sympathy of the public is no longer with the writer, and the stimulative element is lost sight of. The analysis of urns and monuments and inscriptions may be as accurate as it pleases and can be; but unless the dry bones are revived by a presentation in an imaginative sketch of the incidents or times or persons commemorated in them, the humanity in us is not stirred, and the study falls into the shade of depreciation stigmatized under the epithet *Dryasdust*.

The human interest is not to be ignored in the treatment of the most competently written papers. In all treatises of this order on the relics of the past, one wants to find out their relation with man, the when and how of their creation and use. I listened with great pleasure to the careful studies on the caves delivered last session, yet with a latent feeling of regret that a more definite turn could not have been given to the conclusions by a preciser view of the relation of man to the caves and their history. Of course I admitted the force

of the argument that definite knowledge on that point was not to hand, and that the reports were rather of the nature of materials for future inference; but the process of accumulating facts is in itself liable to be rather discouraging unless there is something of the shaping spirit of the imagination about them, issuing in some attempt at even hypothetic colligation. It is admitted that it is easier to assemble facts than to reason rightly from them, less troublesome to gather particulars than to draw the proper conclusions from them. So that it is perhaps not astonishing that the accumulative branch of science shows a far greater development than the ratiocinative. Consider the enormous accumulation of facts, social, economical, political; then turn to the uncertainty of the inferences that are made from these. Consider the conflicting opinions about burning practical questions, such as, *e.g.*, tariff reform. Does it not seem that from the abundant data obtainable about this matter, some rational conclusion would have been drawn that *must* be accepted by all reasonable men? The rational theory of education, whether primary or advanced, is perpetually being spoken of, but mainly from the point of view of prejudice or interest; the disquisitions as to the relative claims of ancient and modern languages have not ceased to excite heat and display of temper; while the methods and subjects of school and University teaching are so far from being universally agreed upon, as to have occasioned the unreasonable growl of the philosopher* that "the vital knowledge—that by which we have grown, as a nation, to what we are, and which now underlies our whole existence—is a knowledge that has got itself taught in nooks and corners; while the ordained agencies for teaching have been mumbling little else but dead formulas."

As one may seek more humanity in the scientific parts of its work, so we may hail the dry light of academic reason on the sides that are dangerous because of the emotions they excite. We sometimes hear the phrase, that such-and-such a discussion is merely *academic*, meaning too removed from the play of feeling and emotion; that is precisely what one could wish to see more of, as a proof and sign that the world is growing more reasonable, more open to intellectual guidance in the affairs of daily life.

The discovery of illuminative principles is usually the result of accident, as is shown by the application of the term *invention* to such discovery. But if the body of facts is not being continually restirred

* H. Spencer, *Education*, p. 25.

and rehandled, the chances of invention are diminished. Hence it seems to me that it appertains to the special function and theory of the Academy, to take up the material furnished by its own researches and the researches of other societies of the same special nature, and to colligate the results of these researches into a temporary hypothesis with a view to invention. Here probably the best expedient would be the preparation of digests, not of the results of one society, but of one branch of study derived from the work of all societies throughout all lands.

Learned associations with special aims, and minor societies, can be safely entrusted with the duty of accumulating masses of fact; but the Academy should keep in view the not less imperative necessity of correlation and theory. This should be the real aim of the Academy, which should not look upon itself as merely another society of the accumulative order. Its function should be largely to arouse interest, to stimulate thought, to originate and disseminate ideas. It is by acting towards these ends that it can best or perhaps only subserve the purpose intended by the charter and by the idea of an Academy. From this point of view it may rightly be urged that greater attention should be paid to the human aspect of learning, and that Literature should have assigned to it a higher place in its work. But not to any great extent from the formal side. Questions of phonetics or morphology in linguistics—of dates and editions in belles-lettres—of incident and marvel in history—these are not the staple for an Academy to mainly handle, but the origin, growth, and interaction of ideas.

This is the need of our age. It was said of old: "There be many that say, Who will show us any good?" So now men are everywhere looking for more light, fresh ideas. If the study of the things of the past, its persons, its events, its relics, be looked on as an end in itself, and not as a means of enlightenment and stimulus, such study will, in the press and rush of modern life, lose its meaning and deserve its neglect. I cannot doubt that in this effort to lay before the world right knowledge of the history of the past, fresh insight into the problems of the present, and sagacious prevision of the needs of the future, the Royal Irish Academy has no ignoble rôle to fill, and that, towards this end, every member will realize that he is a citizen of no mean city, wherein the great traditions of the past stand as landmarks for guidance and as models for imitation. The Academy has for its device a phrase of excellent omen, which I may set down here in conclusion, "WE WILL ENDEAVOUR."

V.

THE ANCIENT CASTLES OF THE COUNTY OF LIMERICK
(NORTH-EASTERN BARONIES).

BY THOMAS JOHNSON WESTROPP, M.A.

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THE study of castellated architecture in Ireland is as yet in its infancy. Few antiquaries have taken up the matter seriously in the case even of single buildings, and there is no authoritative book on the subject in its broader aspect. Stranger still, and unlike other branches of archæology, the literature even of the history and still more of the evolution of these buildings hardly exists—few indeed are the monographs even on individual examples. The paper now laid before the Academy is an attempt to trace the rise of the castles in a single county, from the days when the ring forts were in use to the building of the mansions of the Tudor and Stuart times. Each section of the Survey is intended to give workers an outline of the records and a brief description of the ruins of each castle; and it is hoped that the increasing band of local antiquaries may be encouraged to attempt fuller notes on the more important buildings.

Our material has accumulated for some twenty-eight years; and the reception of the recently published Survey of the churches¹ in the same district encourages us to attempt a similar work for the lay history and topography of this important county. When the Desmond wars are exhaustively studied, the identification of the localities and persons connected with them will become a pressing necessity. Our ambition is to clear part of this ground for the coming historians of that great disaster. We also hope to render more available the almost unworked documents of our Irish Record Office, Peyton, the Inquisitions, the Plea, Pipe, Desmond, and Memoranda Rolls, and the great Surveys of 1655, besides such documents as the Black Book of Limerick, and the rentals of Bishop de Rupefort, 1336,

¹ Proc. R.I.A., xxv. (c.), p. 327.

O'Conyll, 1452, and the Burkes, 1410 and 1520. In these and the nearly unknown Account Rolls and Books of the Cromwellian Government lies the key to the identity and history of the castles. The history (though often broken by the scarcity of documents from 1420 to 1530)¹ is more satisfactory than that of the churches; but we have not been able to visit so many of the remains of the lesser towers, or to get so much help from the kind friends² who helped us with their field notes on the former occasion.

I. TOPOGRAPHICAL NOTES.

The County of Limerick in its present form represents no very definite early divisions of the country, and (where not fenced by the Shannon and the great masses of hills) it has at times undergone no little modification. The parishes of Kilmurrily, Tullylease, Cullen, and Kilcolman, have all been removed; of the encroachments of Clare we have written in former papers. Its partition between the ancient sees of Iniscatha, Limerick, Killaloe, and Emly, shows its composite character; Owey and Coonagh extend into Tipperary, and also mark how conventional was its applotment. It may perhaps be defined as oldest "Thomond" or North Munster; but, by about 380, Thomond had been extended far to the north of the Shannon by the conquests of the warlike kings of Munster, Lugad Meann, and his son, Conall Eachluath. As the centuries passed, the term Thomond got more and more identified with the present Clare. Let us therefore rather note the constituent parts of the present county called after the city of Limerick. The four western baronies—Shanid, Glenquin, and Upper and Lower Connello—formed only the two Connelloes in 1800,³ and the single barony of Connello in 1655. They represent the tribal group of Ui Chonghaile Gabhra, and Ui Fidgeinti, with the Corcoithe (Gortcoyth), Corcomuicheat (Corcomohide), Ui Baithin (O'Meehan), and other lesser tribes.⁴ Kenry includes

¹ The number of places held over that period by the same families marks it as of little "history" and less change. The place-names, also, have hardly ever altered.

² I must specially thank Mr. J. Grene Barry, Dr. George Fogerty, Dr. Henry Molony, and Mr. John Wardell for help at the castles, and Mr. M. J. McEnery no less for his topographical knowledge than for his constant help and advice as to the records, he being the first to appraise the archæological importance of the Desmond Surveys.

³ It is even so shown in Lewis's Map, 1836.

⁴ *E.g.* Cliu mail mic ugainé, as in the "Mesca Ulad"; but this evidently ran into Cosmagh.

the old Caenraighe and Uibh Rosa (Iveruss). Owney and Coonagh are parts of the ancient Uaithne and Ui Cuanach. Small County is approximately Deisbeg; Coshlea corresponds in part to Atharlach or Aharloe; while the Maigue Valley, or, as we call it, Coshmagh, represents to a certain degree Ui Cairbre Aobhdha.¹ Clanwilliam and Pubblebrian, on the other hand, have no single historical predecessor. A part of them along the Shannon formed the tribe land of the Tuath Luimneach. This again split, about 1200, into the vague Escluana and Estermoy; the Irish equivalent of the latter, Aos tri muighe, lay round Crecora in 1420, but that territory was known as Ocholchur² in the previous centuries. The Tuath Luimneach territory was held about the time of the first Norman settlement by the Ui Chonaing or O'Gunnings, who left their name to the castellated rocks of Carrigogunnell and Castleconnell; while Kinelmekin lay round Monasteranenagh.³

In the thirteenth and fourteenth centuries the Norman divisions may be briefly given as the cantreds of—1, Any, Adare, Crumech or Ocarbry—in later years “the Lordship of the Earl of Kildare”; 2, Bruree; 3, Esclon, near Carrigogunnell; 4, Fontemel or Fontymchil, near Hakmys and Tankardstown; 5, Iniskefty or Askeaton; 6, Ioregar or Uregare,⁴ sometimes Grene, Aesgrene or Estgrene; 7, Oconyll or Connello; and 8, Wony, Wethney or Owney. The cantreds were, for administrative purposes, subdivided into “chapters” (or parish groups) and coroners’ districts.⁵

The long predominance of the Earls of Desmond was hardly affected by the existence of the corporate towns, the manors of the Earls of Kildare, and the de Burgos, and the Irish tribes in Pubblebrian (which seems to have sprung up in the later fourteenth century, after the fall of Bunratty), Owney, Coonagh, and Aherloe.

When, at the cost of a deadly and desolating war, the Geraldines were first reduced to submission, their vast territory was broken up (1583–1586), and we first see clearly the later divisions. The

¹ In its greatest extension it reached to Kilmallock (Calendar of Oengus), or even to Ardpatrik on the south, and to Kenry on the north. Dromin was in it in 1088 (A.F.M.), and Athlacca in 1296 (Plea R. 31 and 34).

² The variants Othotoeor, Ocholchur, and Ortholothor in the Black Book of Limerick (44, 96, 100–130) resolve into this form, *e* and *t* being frequently confused by the copyist and in the first *l* and *t*.

³ Charter of Prince John to Monasteranenagh (de Magio), 1185.

⁴ Uregare was Pubblebuskagh in 1586 (Peyton, p. 206).

⁵ Proc. R.I.A., xxv. (c.), pp. 328–331.

“Patria,” or baronies, were Small County, Kenry, Cossetlereoo at Kilmallock, Cosmagh, Pubblebrian, Connello, Clanwilliam, Coonagh, O Brien Ara, and Wony O Mulrian, to which we must add Aherloe. These baronies were divided into Toghes, “tuaths,” or cantreds. Of these we have a full survey for Connello alone.¹ They were—1, Clonhennery, the lands of the MacEnerys (or Corcomohide) at Newcastle, Kilmeedy,² and Ardagh; 2, Tawnagh (or Mahoonagh, once Fir Tamnaige) with its “Trians” or “manors,” Falltach³ (at Aglish and Aghwulke), Tawnagh (at Mahoonagh), and Meane (at Mayne); 3, Gortcolligan, from Ballingarry and Knockfierna, to Temple Glantan; 4, Olybane, at Kilcolman and Rathkeale. The “Church Toghes” were Croghe, Nantinan, Iniskefty or Askeaton, Lismakery, and Killecdey, corresponding to those parishes. The other Toghes were:—10, Dunmoylin, at that parish, Kilcolman, and parts of Robertstown and Shanagolden, up to Foynes; 11, Shanid, from that castle to Killeany; 12, Glancorbry, at Glin and Kilfergus; 13, Farrensesseragh, at Rathkeale, Clonagh, and Kilsconnell; 14, Meaghan Yeaghragh (the older Ui Baithin),⁴ in Rathronan; 15, Meaghan Woughtragh, at Grange, Ardagh, and Athea; 16, Gortcoyth, the older Corcoithe⁵ at Newcastle, Monaghadare (Monagay), Templeglantan, and Glenquin; 17, Killilagh, that place with Clenlish, into the pathless wilds of Slieve Luachra; 18, Ogallawhore at Evegallahoo, Grange, and Newcastle; and 19, Pubblenskagh.⁶ The manors and Signories which afterwards sprang up are better considered with the castles of that barony. The general topography during the seventeenth and eighteenth centuries varies (save in minor matters) very little from that still in use.

2. HISTORICAL NOTES.

ANCIENT FORTS.—As the forts preceded the castles and often determined the selection of their sites, it may repay us briefly to note the position of the earliest recorded and most interesting examples.

¹ A few others are noted as Twoh oreyn in Cheryvabally (Inq. Exch. 54).

² Pubblemunterquyllan lay round Kilmeedy.

³ Named after the Wall family.

⁴ The sergeantry of “Obathan” appears in the Manor of Newcastle, 1299 (C.S.P.I., p. 256), and the Rental of Oconyll, 1452.

⁵ O Huidhrin calls it, “Corca Oiche, of beautiful wood, fair surfaced territory of fresh *inbhers*,” in 1420. It was ruled by O’Macasa.

⁶ A Toghe named Brohill was then in dispute between Cork and Limerick. Pubblenskagh seems to have included Finneterstown, 1586.

Limerick is (with Clare and Sligo) one of the Irish counties richest in early forts. It has at least 2,150 recorded. Unfortunately these, unlike the remains in Clare and Kerry, include no fairly perfect ring-walls; little but foundations remain of the cahers, and the remains of small lime-kilns show to us that their blocks were burned to lime for use in the tillage-fields around.¹ The earth forts are of moderate height (8 feet to 16 feet), ringed with a low mound and one or more fosses and rings. The high mottes are few, but include the fine earth-works of Shanid and Kilfinnane, the last being the Treada na riogh of the "Book of Rights." Shanid, besides its mote, has a large rath with curious cross mounds on the summit; another remarkable fort is Kilbane, on the hill beside Kilbradran church. It has a central ring-wall and two great entrenched side-courts.² Square or oblong forts are not of infrequent occurrence. We may note Cloghonaowney, near Drombanny Castle, and Kells, near Cloncrew (54),³ which measures 250 feet by 200 feet. None are very large.

The average of the ring forts rarely exceeds 150 feet in diameter. Three in Coolrus are somewhat larger. Knockegan, in Tomdeely, near the mouth of the Deel, has a row of four pillar-stones, in line from its southern edge, which recall the pillars at the fort of Tara Luachra. Badger's fort, near Kilpeacon, has a dolmen within its outer ring. There remain at least thirteen forts⁴ of more than 300 feet diameter. We can only give their names and dimensions here. Ballinscula (40), 300 feet across, 380 feet to 400 feet over all, with a small fort adjoining. Knockowra (19), near Shanid, and Reerasta (28), near Ardagh, each about 300 feet across. In the latter were found the brooch and beautiful chalice of Ardagh. Croaghane, near Knockpatrick (10), is from 350 feet to 450 feet over all; Greenish Island fort (10) is 350 feet over all. Rathcannon fort, near Athlaca, utilises a craggy ridge to form part of its ring, which is 380 feet across. Dromin, in Grange (36), is 400 feet in diameter; Drombanny (13), is an irregular double earth-work with fosses, about 400 feet long and 200 feet wide. The following forts exceed 400 feet in

¹ So perished the walls of Emania. See "Ancient Forts of Ireland," Trans. R.I.A., xxxi., section 71.

² Shanid, R.S.A.I., xxxiv., pp. 320, 338; Kilfinnane, p. 335, and R.I.A. Trans., xxxvi., section 347. Kilbane fort, Proc. R.I.A., xxiv. (c.), p. 275.

³ Ordnance Survey Map, No. 54, of Limerick.

⁴ This does not fall in with the theory that the small fort is Norman and feudal and the large fort alone tribal—as recently advanced in the English Historical Review. The general teaching of all the Irish counties is the same.

diameter: Killeen, near Springfield (54), and Dunganville (28), a fine fort on the Daar river,¹ are each about 420 feet across. Doonglare (49), the ancient fort of Claire, in the "Book of Rights," is a few feet wider; it rests on a furzy hill near Ballingarry in Coshlea. The Kyle of Lisheenasheela (45), in Kilmee, is oval, 300 feet to 500 feet over all; while the great ring-mound of Dromin (37), in the centre of which stands Cloncagh church, is, we believe, the largest earth-work in the county, being from 750 feet to 770 feet across.

THE FORTS IN HISTORY.—As the districts of which we treat come slowly within the feeble light of our early records we see, standing out as one of the principal centres, the fort of Brugh righ, or Bruree, a residence of the earliest known kings of North Munster. The reputed founder, Oilioll Olum, is (as handed down to us) a somewhat mythic personage; but, even after dismissing all the obviously mythic and even marking as doubtful the details of his warlike acts, we have probably left to us a shadow of an actual prince of renown in the third century. He is accredited with having established the alternate succession at Cashel; and so important a fact as this might well have been handed down at least as far as the legends of the Armada and of the civil war of 1650, which are rife in our time. Ethicus found "volumes" and students in Ireland in the fourth century;² founders (as Hamlet says of those of churches) are kept longest in popular memory, and Oilioll's great raths may have kept his remembrance green down to the Christian writers of the fifth century. Bruree is a ring fort in the fields near the Maigue, the central portion 60 feet across and 18 feet high, with two ramparts 40 feet wide and 12 feet high, and a fosse. Near it is another fort of closely similar design. The castle we hope to describe hereafter.

Duntrilcague fort, named from the pillars round its well, figures in the strange legend about king Cormac Cass, in the "Book of Lismore."³

When St. Patrick visited the district, *circa* 440, the following forts stood among the Dalcais, if we can place any reliance on the early "Lives":—Prince Carthan dwelt in the fort of Sangal or Singland, beside the open fields and island where Limerick was to lift

¹ "Astaregh," in Peyton's Survey.

² Stated by Ethicus of Istria, a writer of the fourth century. See Dr. Joyce's "Social History of Ancient Ireland," vol. i., pp. 19, 403. Ethicus "hastened to Hibernia and remained there for some time examining their *volumes*"; and he called the Irish sages "unskilled toilers and uncultivated teachers."

³ *Silva Gadelica*, II., p. 129.

its spires; Rathbroccan and Rathcoirbre, near Cella-rath, and Dun nOacfeine, near Donaghmore, are also named.¹ Many early forts are recorded in undoubtedly ancient works. Grian was of importance about 450. The ancient fort of Dun Bleise, or Doon, in Coonagh, is named about 580,² Rath ui druaid in 596,³ Cathair chinn chonn (in Rockbarton) and Aine were scenes of battle in 637 and 666.⁴ The latter figures as Sid Eoghabhaille in "The Colloquy," and as "Drom Collchailli" in the "Mesca Ulad." Shanid must have been of hoar antiquity even in 834, for its name means "ancient residence." The numerous records of the Ui Chonaill and Ui Fidgeinti do not mention their forts in the earlier centuries. If the "Book of Rights"⁵ dates substantially from the very end of the ninth century, we have a long list of the forts claimed by the king of Cashel, 870 to 900. We find among them Dun-Eochair-Maige, at Bruree⁶ (Brughrigh); Dun Gair, at Lough Gur;⁷ Geibthine, at Askeaton; Aine, at Knockaine; Rath arda Suid or Rath suid, at Rathurd;⁸ Muilthead, on the Mulkearne river; Cathair-chinn-chonn; Cathair meathais; Aenach Cairpre, at Monasteranenagh⁹; Drumchaein, perhaps Drumkeen; Asal or Magh n Asail, at Dromassell or Tory Hill; Cuilleann or Cullen; Claire, or Dunglare; Drum Finghin and Treada na riogh, at Kilfinnane; a second Drumchaein, apparently on the border of Tipperary; Seanchua Chaein and Rathfaelad.¹⁰

An unknown fort of the Ui Fidgeinte called Cathair-cuan was

¹ Tripartite Life (ed. Whitley Stokes), pp. 201-207.

² Cal. Oenghus, Jan. 3.

³ Annals of Inisfallen.

⁴ Maelduin, king of Munster, defeated at Cathair cinn con, 637; see also notes on "The Battle of Dun na Gedh" (ed. O'Donovan).

⁵ (Ed. O'Donovan), pp. 87-91.

⁶ Dun Gaifi, the house of O'Donovan, where king Mahon was betrayed, is usually taken to be Bruree.

⁷ For these crannogs and forts, see Rev. James Dowd, "Round about Co. Limerick," pp. 65-75.

⁸ The Four Masters attribute it to one of Heber's chieftains and the respectable antiquity of A.M. 3501.

⁹ Mr. Goddard Orpen has a most suggestive note, R.S.A.I., xxxvi., p. 34, in which he identifies Aenach beag, or Aenach Cairpre, at Monasteranenagh, with the ancient Aenach Culi—Enach Culi, in Corbaly, in prince John's charter to Magio, 1185—and suggests that the fort of the Book of Rights is Rathmore, near that Abbey.

¹⁰ Identified, though improbably, with Rathkeale, which place is Rathguala and Rathkel in the earliest records, whether Irish or Norman, known to us.

plundered by Brian in 973.¹ It may be connected with Cuan, son of Conall, chief of the same tribe in 642, who fell at Carnchonail. Our records also tell how the same Brian, now High King, repaired or made (in about 1002) the forts of Lough Gur; Lough Ceann, near the last; and Lough Saiglend; with Dun-cochair-maige, Cenn Abrat; Inis an Ghaill duibh; Duncrot, now Dungrot, in Aherloe; Duncliath, probably Aine cliach;² and the unknown Dun Aiched, in north-eastern Limerick.³ The last was ravaged by the Connaught army in 1084 along with Brurigh and the Lough Gur forts: O'Donovan fancies it to be Dunkip near Croom, but gives no reason for this decision, though he may be possibly right.

In the twelfth century, the only notable additions to our list are the forts of Cromadh or Croom, burned in 1149, and Caslen ui chonaing, or Castleconnell, where certain O'Briens suffered blinding in 1175 by the graceless King Donaldmore, their relative.

In 1171 the Norman invasion had reached Limerick, and the building of castles had commenced ere the last two years of the century ran to their close.

TARA LUACHRA.—We cannot pass in entire silence over the question whether a fort, much noted in legend, lay in the county of Limerick. Temair, or Tara, Luachra was a chief residence of the mythic chieftain Curoi mac Daire, who held Cliu-mail-mic-ugaine and Luachra in south-western Limerick. It stood in eastern Luachra, and is said to have been destroyed by the Ultonian King Conor mac Nessa, with Cuchullin, Celtehair, and others of the heroes of Eman. It has been identified, evidently from the name alone,⁴ with Ballahantowragh near Castle Island in Kerry. Now the Four Masters state positively that it was the place where Pelham encamped on his way to Tralee in the spring of 1580. If so, Pelham's letter all but settles the question, and narrows the place in which Tara stood to one of two hills. He writes that, marching from Glin southward, he came through "Sleulogher," and camped east of "Duwau" (Duach, Kerry) "by the river Viall (Feale), near a place of

¹ Wars G. and G., p. 103.

² Cliach must have spread over north-eastern Limerick and into Tipperary, as shown by the names Uaithne Cliach and Aine Cliach, Aradha Cliach and Airthir Cliach.

³ Wars G. and G., pp. 103, 141.

⁴ A very common fault of Irish topographers even in cases where material for identification is more abundant.

the Earl's called Fort Renard"—Portrinard near Abbeyfeale.¹ The spot here indicated suits very well the definite account of the fort and its site in the "Mesca Ulad." If that legend be as reliable in its description of the fort as of the route across Ireland² and the places pointed out to Laeg by the "Hound of Ulad" from Knockaney Hill, the spot is well defined. It lay to the south-east of Aine, in eastern Luachair,³ on the eastern slope of a mountain overlooking a glen noisy with wildfowl, beyond which, on another ridge, covered with oak-trees, lay several lesser forts. The rath itself had a "mur" or rampart,⁴ high, both within and without, a souterrain in its garth and several pillar-stones outside its rings; in short, the typical fort of that district. We are told that the Ultonians forded the Boyne, Brosna, and Maigue, but not that that they forded the Feale.

The name seems to have perished at Portrinard, unless it be Tooradoo on the north of Knocknasnaa, which overhangs the valley.⁵ Turagh, near Tower Hill, in eastern Limerick, was "Teauragh"⁶ in 1655, so the change of name is possible. There are, however, two sites which (apart from the question of fording the Feale) have nearly equal claims.⁷ Both overhang Portrinard and the river, the one in Knocknasna⁸ (a hill some 600 feet high in Limerick), the other at Ballynemuddagh Hill, above the road to Duach (Kerry O.S., 17,18).

¹ A.F.M. 1580 and note, Carew Papers, p. 237; Mesca Ulad (ed. Hennessy), pp. 15, 17, 19, 21, 27, 33, 53. Peyton, in his abundant notes on "Slelogre," 1586, does not give any Tara in Portrinard Manor, pp. 170, 171 b, as his Tworyn may be a "Tooreen" name in Tulligoline, the legendary site of a battle. The confiscated lands in the Kerry Book of Distribution, p. 126, cover Duach, but do not extend to Ballynemuddagh.

² However mythical their events may be, the topography of Irish Legends is generally above suspicion.

³ This would dispose altogether of Ballahantowragh, which is not even in Luachra, but far to the west of it.

⁴ There were two stone forts, now entirely levelled, called Cahergal (the southern being of considerable size) to the west of Duach, but not in eastern Luachair.

⁵ Was it "dubh" because it lay on the shady side, to distinguish it from a "Toora" on the sunny slope over Portrinard, like the forts Cahernagrian and Caherduff near Crumlin in Clare?

Tooradoo is on Knocknalaght, a hill 746 feet high.

⁶ See O. S., 15, and compare Down Survey, A. 30; Civil Survey, xxx., p. 8, Book of Distribution, p. 115, and Act of Settlement, 1666.

⁷ Pelham camped at Dowau (parish), but the "at Temair Luachra" and "at Portrinard" equally leave the question open.

⁸ "Knocknashaunagh," near Portrinard. Book of Distribution, p. 6. Possibly Cnoknesanathe, 1452, Rental of O'Conyll.

Each has a ring fort, the latter an unusually large rath 300 feet in diameter, overlooking the glen eastward and having lesser forts on the opposite ridge. Glenagragarach¹ in these hills (but too far northward to claim a place in the legend) shows by its name how the cry and cackling of wildfowl in these valleys impressed itself on the people. Doubtless, the valleys at Portrinard were equally full of "sturdy geese, rapid swans, starlings, ducks, and cranes," with the glen in the legend; and its oak-clad eastern ridge has an analogy in the name Glendarragh, to the east of Tooradoo.

Finally we may note that the Cladhruadh, the ancient road of Cleeroe, ran over Knockanure Hill almost to Athea, and, perhaps, led to Knocknasnaa in the neighbourhood of that village.

3. THE EARLIEST CASTLES (1192-1290).

The "encastling" of Munster was a deliberate and slow process.² The appointment of a Governor of Limerick City by Henry III. followed (and was as real as) Donald O'Brien's submission—a mere nominal assertion of Norman power. Even the capture of the town in 1176 gave but a short foothold to the foreigners. Reymond and Meyler had forced their way over the river and "the Danish walls of the Island City" in vain. Donald blockaded them all the winter, and, despite his severe defeat near Cashel, waylaid them at every turn. On the death of Strongbow, Reymond was anxious to go to Dublin to look after his own interests. None of his men would accept so undesirable a command, and so he took the incredible step of "swearing in" Donald O'Brien. As soon as the Normans filed out of the town the inevitable result of their foolish act ensued. Donald saw the last man over the bridge, which he then broke down and burned the town before their eyes. They watched the fire in helpless disgust and retired to Dublin. In 1194, however, the fierce old Dalcassian had died in peace and been buried within the new Cathedral under his lion-guarded slab. John Earl of Mortain appears to have secured Limerick to the English by building a castle with a bridge into Thomond. He incorporated the place by charter before 1197. The Irish seem to have taken it again. That year and in 1200 Cathal O'Conor ravaged its market-place, which probably lay

¹ See Dr. Joyce, "Names of Places," Series II., p. 318.

² For views on the early Norman Castles refer to a paper R.S.A.I., xxxiv., p. 337, and a list of the earliest recorded Castles, pp. 344, 345.

in what we know as the Irish town; but it affected very little the rising city and the Norman power.¹

Meanwhile the Normans were spreading a net on three sides of the city. They had fortified the ancient mote of Knockgraffan, with Kilfeakle² and (probably) Dunohil, in Tipperary. They had made four bretasches³ or wooden castles at Emly, which were burned in 1195. At last, in 1199, they built a castle within the limits of the county, on the rock of "Karakitel," near Kiltteely. This was granted to William of Naas. The old fort of "Karkinles," Cahirconlish, eight miles nearer to Limerick, was next fortified; and they built a castle on the Island at Eas Gephthine on the Deel, and one at Ardpatrick, near Foynes. About the same time, though it first appears as an established place in later records, they built a castle at Escloun (or, as some crusader probably rendered it, 'Askelon'), perhaps at Newtown de Esclon, near the mouth of the Maigue. Some have supposed that it was a predecessor of that great fortress that "lifts to heaven its diadem of towers" on the rock of Carrigogunnell; but, though both names are contemporaneous, they are never equated. Limerick possessed a "bawn" in 1200, which with the repairs needed there in 1217 implies the earlier rather than the later date for its castle.⁴ The following year the second "Rock of the O'Gunnings" was granted to William de Burgo by King John, with the stipulation that "if he fortify the same and we desire to have it, we will give him a reasonable exchange." There was built that castle known to us as Castro I Coning, Caslan Ui Chonaing, and Castleconnell.

A castle stood in the important town of Kilmallock in 1206, when the limits of the districts of Limerick and Cork were first determined. Another had been built at the old fort of Cromadh or Croom, on the river Maigue by about 1216, and was given to Maurice Fitz Gerald. Its

¹ The authorities used in this section are the Annals of Loch Cé, Inisfallen, and Four Masters; the Calendars of Documents relating to Ireland; Patent, Close, and Plea Rolls; Inquisitions, &c. They are cited fully under each castle in the subsequent survey.

² The castle of Kilfeakle stands at some distance from the mote.

³ For such structures, see R.S.A.I., vol. xxiv., pp. 332, 337. "Castles of wood" were taken by Sussex, in County Clare, after the capture of Bunratty in 1558 (Carew i., p. 276), and the palisaded mote of Ballysonan in Kildare, was taken by the Parliamentary forces in 1648, R.S.A.I. (1856-7), iv., consecutive, p. 111.

⁴ The Annals of Clonmacnoise, in telling how Meyler de Bermingham and Cathal Crowderg O'Conor expelled William de Burgo from Limerick in "1202," states that they "refused to give him one castle there."

rent in later years was threepence and a hawk to the Earls of Kildare. About this time the connected records of Limerick Castle commence, and it is very probable that the low fort on the marshy bank of the Maigne, near the old "ford of the oaks," at Adare, was walled and formed the germ of the miscalled "Desmond's Castle." At any rate, the manor and market town of the de Verdons flourished there ten years later. Of even earlier date, to judge from its style and masonry, was that strong tower which, from the summit of the high mote of Shanid, looked across all northern Limerick and central Clare, and guarded the passes towards Kerry. Its first appearance in our existing records is merely to locate a smith's house in a deed of 1298.

Bruree Castle, a singular round fortress, suggestive of Castle Hag in Lough Mask and other "mortar-built cahers" of acknowledged early date, was probably built by the O'Donovans before this time. Towers were subsequently added.¹ Two Normans named Robert, distinguished as "of Dundonill" and "of Guer," founded two castles bearing their names, at Cloghnarold near Rathkeale and on the tidal creek near Foynes. The third Castle Robert, near Adare, only appears about 1280.

Besides these important strongholds, several lesser castles are named: Blathac (not the Blathac at Drogheda, but one of the castles given to the City of Limerick by John) was perhaps at Castle Blake or Castle Blauke near the Thomond Bridge. Caslan Uilchin, sacked by O'Conor in 1201, lay apparently between Limerick and Castleconnell; it is named down to 1281 and then vanishes. Coonagh had a castle and tower,² built before 1246, which needed repair in 1278. Castle Aqi or Agni is named with Cahernarry, and was probably Aine; the latter has undoubted records from 1287. A Castle Amery, subject to the dower of Almerica de Bellofago, appears in 1296.

Of manors on which no castles are mentioned a list may suffice: Mungret, 1225; Corcomoth, 1230; Ardagh, 1238; Rathkeale, 1252; Iniskefty; Reyns; Moy Tauenach; Newcastle Oconyll; Corcoithe; Any (with Lough Gur, Kilfrush, Knocklong, &c.) in 1287. Maurice Fitz Gerald and his wife Agnes de Valence held Adare; Castle Robert;

¹ Probably by the de Lacey family.

² Identified by Sweetman as Old Connaught near Bray, but evidently on the border of Limerick or Tipperary in Coonagh—perhaps Castletown or Cullen. It is stated in C.S.P.I. (3108) to have been the castle given by King John in 1215; but in the original document the Cantred of Oeconach and Tibrary alone appear. (*Ib.*, 621).

Cromyth; Wrgidy (part of Uregare); and Grene in 1292, while Thomas Fitzmaurice held Glenogra (with Cathirgilmore and Athleacath). Reginald Russell and his wife, widow of Thomas Fitzmaurice, held Shanid (with Kilcosgrave), Rathronan, and Newgrange, in 1293. The other manors of Fitzmaurice were Newcastle, Corkoigh, Moytaunagh, Kilnehyhyn,¹ Ardagh, Kilbradran, Newgrange, and Moyero or Croagh.²

The castles alleged to have been built by the Templars, find no support for their origin in extant records. That hapless Order seems to have possessed only a small plot of land in Limerick in 1308.³

THE FOURTEENTH CENTURY.

The story of this century is that of the collapse of the Norman power. At first the strong organization of Edward I. held its own. We hear for the first time of the Manors of Meane or Mayne, 1307, and Garth or Ballingarry, in Oconyll; but records of castle-building become rarer. A late "authority" states that Rathmore Castle was built in 1306. Limerick Castle was repaired in 1313, and other works followed, probably from fear of the Scotch invasion. As the Bruces advanced, the long quiescent Irish tenants rose in revolt. Most dangerous were those of Maurice Fitz Thomas, who rose at Rathkeale and destroyed Newcastle Oconyll in 1315; but the Scotch princes fell back, and, instead of a second Bannockburn, Edward Bruce found a Faughart Field, and fell, exulted over by the Irish he had helped no less than by the Normans he had ravaged.⁴

After the danger had passed the English found everything out of joint. The de Clares and their colony in Thomond were "wiped out" by the battle of Dysert, though Bunratty was reoccupied. That same year (1318) Therly or Durlas near Garth is named. In 1320 the castles of Corcomoyth belonged to Robert de Welle and his wife,

¹ Perhaps "Killanohwne," which surrendered to the English, 1569, and is evidently Glenquin or "Glannohwyn," Kilnehylin Inq. 1299.

² Doubts as to the identity of these names are removed by Inq. Chancery, Car. I., 240, "Maner cas. vil. et ter de Crowagh als de Moycrowagh." The heading in Black Book of Limerick (see Proc. R.I.A. xxv. (c.), p. 374) seemed of too slight authority to overbear other notices, as the headings belong to the copyists, not to the grantors.

³ See R.S.A.I., vol. xii., pp. 331, 333, the original document being in Brit. Mus. Plut. c. lxxix., D., p. 375.

⁴ See exultation of the "Annalist of Clonmacnoise."

the sister of Richard de Clare.¹ The Patent Rolls contain grants for the general repair of castles throughout the county in 1334, and for the repair of the walls and bridge of Limerick the following year.

These years from 1332 to 1334 were disastrous to the English. The unending hate of the O'Briens and Macnamaras watched its opportunity, captured and destroyed Bunratty Castle, the outpost of Limerick and key of the river on Thomond side. In the same year the hostages in the castles of Nenagh and Limerick overpowered their keepers and took the castles. At Limerick the Governor himself fell into their hands, and the castle had to be stormed by the mayor and citizens, the hostages being put to the sword. The prisoners of Nenagh facilitated their own ruin by burning its gate, and the strong round keep, with its occupants, was soon in the hands of the Government. Disaster spread, "the castle of Totomay" was levelled, and even the distant Newcastle Castle in the far east of Leinster was taken by the O'Tooles. More trouble arose near Limerick; and Ufford, the Lord Justice, had to invade the Earl of Desmond's lands and captured two of his castles in Connello and Kerry, the last being Castlemaine.

After three disastrous years, quiet was restored. John Darcy repaired the castle of Adare in 1334, and there is a grant for the repair of castles in Estgrene the same year. Cahirconlish, which had been utterly destroyed by Prince Torlough O'Brien about 1286, was fortified with a stone wall in November, 1338, being on the marches of the Irish, who menaced the town. Doubtless the expulsion of the Clan Brian, O'Kennedys, and others from Clare into Ara after 1318 led to corresponding pressure on the English border. Other repairs of the walls and bridge of Limerick and of various unnamed castles in the county belong to this decade.

Maurice de Rupefort, Bishop of Limerick, had a careful survey made of the see lands in 1334. His manors were Mongareta; Killoe, or Kilmallock; Clonshire; Drochetarsna; Ardacha and Lamkaill, or Loghill, with lands at Dromdyle and Dissert Marrgeoin (Tomdeely and Morgans). The only castles named are "the Lord's (Bishop's) in Mongaret" and Creggane in Kenry. Of places where castles stood in later days, he names Leakdon (Lickadoon), Crewemaille (Balliclogh, near Knocknegall); Ballycathan, Villakeating (Cloughkeating), Baly-nacloghy (Stoneville); Rathnaseer, Downmoylan, and Cnoepatruck.²

¹ Grossi Fines, 14.

² A copy made in the Black Book of Limerick is partly legible. Of this, when

All this work, however, represents but little improvement in English affairs. King Edward's heart was set on his French wars. Creçy spread his fame over Europe, but a victory in Tradree might have re-established his power in western Ireland on a permanent basis. By the time of Poitiers the only power to be reckoned with in Limerick was evidently the Earl of Desmond. A new force was, however, at work. If the Exchequer Inquisition, No. 2, is reliable as to past history, the O'Briens built Carrigogunnell¹ castle two centuries before its date, *i.e.* in 1336. This squares well with the buildings and the weakness of the English power at that time. The O'Briens had now a way into the heart of Limerick, and cut off the waterways to the city and to Adare and Croom, as the de Clares had secured the heart of Thomond in 1275. The history is, however, very obscure, and the later chiefs deduced their descent from Brian Duff, son of Prince Teige Glenore O'Brien, who died in 1426. There seems some belief that the MacNamaras once held it; perhaps this preceded the settlement of Brian Duff.

No other great blow fell for a generation. Then a disaster more alarming, though less permanent in its effects, than the battle of Dysert overtook the Geraldines and the city itself. Garrett, Earl of Desmond, gave shelter in 1369 to an exiled prince of Thomond; Brian, the nephew of the latter, followed his uncle and reached Monasteranagh, where Desmond, probably without his full levy, met him. O'Brien was victor in a fierce battle, dragged Desmond from the shelter of the neighbouring abbey, and appeared before Limerick, which, in fear or by treachery, opened its gates to the victors and was plundered, even to its churches. The castle evidently held out, but Sioda MacNamara was left "Governor of the city." When O'Brien had left, the English took heart and rose against the Irish, whom they expelled, killing Sioda, and, with the aid of Sir William de Wyndsore, compelled the MacNamaras to restore the books and plate of the cathedral. The fortifications of the city were repaired in 1376, and "Tom Corr," Balbeyne, built a castle in the middle of the Irish town and called it after his name, dying in 1402.

entire, a copy is now in possession of the Protestant Bishop of Limerick, and was made about 1619.

¹ Carraic ui chonaing (or "conning" in one copy), *Annals of Inisfallen*, 1209-1226, Carrig Gunning, 1590, map. A similar change takes place in the name Castro I Coning, now Castleconnell. In 1535, Parry in a letter to Cromwell mentions "the Castell named Carygoguyllen," *C.S.P.I.*, p. 285; and we even get the form "Carraco Cainnell" in the following year.

The legend of the defence of Ball's Bridge,¹ by John de Gallwey, in 1361, may be noticed, and is very probable, as the family owned house property at that bridge in a later generation; but the exploit of this Horatius of Limerick has not been celebrated in the Annals known to us. The bridge does not appear in the escutcheons on the monument of 1405-1420, but only on Elizabethan tablets.

THE LATER CENTURIES.

Little is recorded about the building of the castles, and nearly as little of their history for about a century and a half. The walls and towers of Limerick were repaired in 1407, and Ballingarry in Oconyll walled, and perhaps the castle rebuilt, in the following year. Tradition asserts, with the greatest support from probability and the architecture, that Askeaton Castle was enlarged and the great hall built by the seventh Earl of Desmond, from 1420 to 1460.² In 1452 was compiled the invaluable rental of Oconyll. It covers the Desmond's manors of Shened, Kylyde, Corcoith, Bathn (Ui Baithin or O Meehan), Ardagh, Newcastle, Robertstown, Rathgalwey,³ Moytawenagh, Iniskefty, and Offargus (Kilscannell and Clonagh). It only mentions four castles, Iniskefty, Castle Robert of Doondonnell, Robertstown, and Newcastle.

The city seems to have prospered, and extensive additions and costly monuments adorned its cathedral. In the county the beautiful monasteries of the Franciscans at Adare, and additions to the other convents of Adare, Kilmallock, and Askeaton, show that leisure and money were available for art and peaceable pursuits.

To this century, too, and especially to its latter half,⁴ we must attribute the majority of the peel towers raised in the county, the greater works at Cappagh and Askeaton, and some additions to the castle of Adare. Not only in this county, but all over Ireland, broke out this passion for building and repair. In the case of Limerick we

¹ Chancery Inquisition, No. 8. John Galwey of Kinsale held "the house of the cross . . . in 1576, and the Tye Bridge, alias Droghedmoyle." The name was evidently "Bald Bridge." It is also called the "Tide Bridge" in Hardiman's map 63, about 1590.

² This is borne out by the old documents used by Teige Ui Neachtuin in 1723, in his curious "Abhallghort," now in possession of Mr. M. J. M'Enery, P.R.O.I, who showed me the passage.

³ At Galwey and Ballycullen near Askeaton.

⁴ An Act of the Irish Parliament, 1453 (xxxii Hen. VI.), offered to him "that shall build a castle upon a border," a sum of £10 (Carew MSS., vol. i.).

may avail ourselves, through its close connexion with Clare, of the light thrown on the peel towers by the "List of Founders"¹ of the castles in the latter county. The question is closely connected with that of the repair of the churches, and gets corroborated and checked by recorded facts of ecclesiastical buildings. Following the analogy of the "Founders' List," we may conclude that some of the peel towers date back to about 1380, still more from 1400 to 1450, and a great majority from that to 1500, with a few at intervals down to 1540, when a later and more commodious type of residence came into being. The long comparative peace in Ireland during the reigns so warlike and perturbed in England, and the successful trade of the seaports and even of the little inland towns, helped the movement; and the Irish chiefs claimed and were paid customs which paid better than pillage.² The towers were not castles, but strong houses, intended to resist petty plunderers rather than even the feeblest siege operations. This gives them merely the interest of being the residence of those who "made history"; they rarely played any part in war,³ and are devoid of those thrilling memories which cling like the ivy round the walls of the castles of England, France, and the Rhine land.

They also recall the fact that down to nearly 1470 the English dwelt under the mainly fair Government of the Crown. "The lords and gentlemen wore English habit, kept good English order, and the laws were well obeyed. The king derived 2000 marks a year, and the Earl of Desmond's income was about £500. Thomas and James, Earls of Desmond, changed all this; the latter put coigne and livery on the king's subjects for the first time, when he was appointed Governor (1472); and in his grandson's time, in 1515, the Geraldines are said to have derived the incredible sum of £10,000 a year off the irstates, while the Crown revenue in Limerick had almost dwindled to nothing."⁴

¹ See Catalogue of Irish MSS. in the British Museum (S. H. O'Grady), and Proc. R.I.A., Series iii., vol. v., p. 451.

² Limerick paid O'Brien of Thomond and O'Brien Arra £40 each and dues (Carew MSS. i.). In the Inquisition of 1542, Mahon O'Brien of Carrigunnell took 1*d.* for each barrel of wine, and 2*d.* for each other barrel. O'Kahane of Keilrush, Clare, took 6*d.* on each ship; the Macnamaras, 2*d.* on each barrel, cow, and horse, and 6*s.* 8*d.* on every man wearing a cap. O'Brien of Thomond took the same imposts except the last. Donough O'Brien took 20*d.* a pack, and 5*d.* a horse-load, from Limerick to Waterford.

³ And accordingly are hardly ever mentioned in the Irish Records.

⁴ Carew Calendar, vol. i., p. 6. Lodge (citing Davies) asserts that Thomas an

Little more need be said in this preface. We hope at some future time to collect into a general historic review the later story of the castles. We have here led up from the days of the forts to those in which nearly all the castles now extant stood completed. In 1536, Lord Gray took (and, by an imprudent act, had to retake) the castles of Carrigogunnell and Derryknockane. Little else of change occurred till Desmond's rebellion laid waste the province, and his estates and castles were given to strangers. The fine surveys of 1583-6, the Desmond Roll, Peyton's Survey, and the Inquisitions give us very full information about the castles and their owners, from that time to 1641. Then the Depositions tell their sorrowful story, which is closed by the second great confiscation, told by the Down and Civil Surveys, the valuable Account Rolls, and endless public and private records. The Act of Settlement grants tell, with abundant other documents, of the restoration and settlement of the country under Charles II.; the Rolls and Surveys of 1688 to 1703 of the disturbance of that period of promise by the imprudent James, and the ruin which fell on him and his too loyal adherents.¹ Thence there is little to tell of the history of the castles of Limerick.

CLOSING NOTES.

As to our method, a few words of explanation are necessary. No castle is included save where unequivocal trace of the building remains, or a specific statement of its existence is found in a reliable record. We use much caution where there is only a single record, such as a casual mention of "castle and land," at any place, and still

appagh extorted coigne and livery, and rejected English Government before 1298. This is opposed by the Rentals, Plea Rolls, and other documents down to the Rental of Oconyll in 1452. Much more probable is the allegation that the dues were claimed by that later Thomas, Earl of Desmond, who lived in 1465 (see Carew MSS., vol i. and ii.), or by James, Earl of Desmond. In June, 1588 (C.S.P.I., p. 548), the rents, moneys, and victuals of the late Earl of Desmond include these imposts:—Shraughe, Marte, Chiefry, Coiny, Livery, Kernety, Sorren, Galloglas, Kerne, Bonnaught-beg and -bor, Musteroon, Tax, and Tallage (or Southe refection), Coshery, Cuddy, Gillicree and Gillycon. Peyton notes numerous lands subject to the "bonnybur," "Sorrohen," "Sessy-malone," "chiefry," &c. Musteroon was for the repair of castles. In 1552 the Anglysh family complain that they had once been free of all cess (save the "cynduff" for Galloglass, and 1 mark to the chief Lord Burke) from Cashel to Greane. Decree of James, Earl of Desmond, and Sir G. Aylmer (Pat. R.).

¹Land worth £61,500 was confiscated in County Limerick alone, being 14,882 acres.

more where only a view of a castle is found on an ancient map without any written statement. In such cases error may have arisen or a house been named a "castle." Where there is more than one definite record, the non-occurrence of remains at the place disproves nothing. On the other hand, an alleged site, even with foundations or a fragment of wall, without records, as in the case of Nicker, we regard as most doubtful.

We cannot guard against the giving separately of two groups of records, or the records and a site, which may belong to the same castle. As a pioneer, such mistakes are more than possible in our work. The cases of Esclon and Newtown, or of Caslenuilchin and Castleurkine, may prove to fall under this head. The opposite may be found to be true of Castle Blake, which we have been led to identify with Castle Blathac; and we would rest content if we dared hope that no other errors might be found. Despite every care, it may also happen that a record may have got transferred from the actual castle to one of similar name; but we have usually withheld all equivocal documents, and where doubtful of the identity, we give the records under different sections. We collect under the barony, the parish (so far as lying in the barony), and the townland, and give after the name the number of the map in the Ordnance Survey of "6 inches to the mile."

The number of castles was really amazing. In the north liberties of Limerick, round Oola and in parts of Connello, castles appear in every third or fourth townland. Tradition in Limerick seems less reliable than in Clare; but local workers may be able to correct this impression, though more critical inquiry is necessary in collecting legends now that history is more accessible. Still the influx of English families absolutely uninterested in the past story of their lands must have sorely affected tradition in this county.

As in the Church Survey, we condense the records of the more important structures, but give them as much as possible to throw light on the more obscure buildings. We also adopt the Ordnance Survey name for the section, but give the variant forms in the records.¹ We must deprecate the disappointment of readers unacquainted with the limitations of material and space which beset our work. Some who have spoken to us appear to expect family history, and even personal biographies, and connected pedigrees of

¹ We sometimes use a "typical" date, *e.g.*, "1590," for Hardiman maps of 1582-1600; 1655 for Civil Surveys, &c., 1653-1657; and 1583 for Desmond Surveys, 1582-1587.

their families, to be given along with the account of their old homes. Others have expressed hopes of finding "thrilling accounts" of the "heroic last stand of the Desmonds," and "the undescribed deeds of war round our ancient towers." Others, more reasonably, expect "full histories of the native Irish,"¹ among whom they often appear to confuse the old Englishry. None of these can we fully satisfy in a survey such as this.

The needs of the antiquarian student and topographer must be first considered and supplied. Field lists are a most pressing want to Irish antiquaries; these we strive to give, while many will find new facts relating to their families and to the old buildings of their neighbourhood, which may form in their hands the basis of fuller and more interesting papers possible in a study of a single castle and its owners, but impossible in a general survey.

For the rest, we leave our work to the charitable opinion and the practical criticism, correction, and addition of all who may use it as a stepping-stone to better things.

ABBREVIATIONS AND CHIEF AUTHORITIES.

Acct. R.,	. Account Rolls, P.R.O.I., Limerick district, 1650-58.
Ann.	. Annals, viz., Ult., Ulster; F.M., Four Masters; Inisf., Inisfallen; Clon, Clonmacnoise; L. Cé, Loch Cé.
B.B.L.	. Black Book of Limerick—Maynooth.
B.D.	. Book of Distribution and Survey, P.R.O.I.
C.	. Castle.
C.S.	. Civil Survey of 1657—P.R.O.I.
D.S.	. Down Survey—"A," unburned; and "B," burned maps. "Petty" refers to the Vallancey copies of the maps taken to Paris.
Dep.	. Depositions, County Limerick and Clare, T.C.D.
Des. R.	. Desmond Roll, 1583—P.R.O.I.
Dub. Reg.	. Registry of Deeds, Dublin.
Fi.	. Fiants. The date shows the reign; the numbers refer to the Appendices to the Report of the Deputy Keeper of the Records, Ireland, Nos. 11 and successive.
FzG.	. Fitzgerald and Macgregor's History of Limerick.

¹The Irish Annals are practically blank, so far as the history of the lesser Limerick castles is concerned.

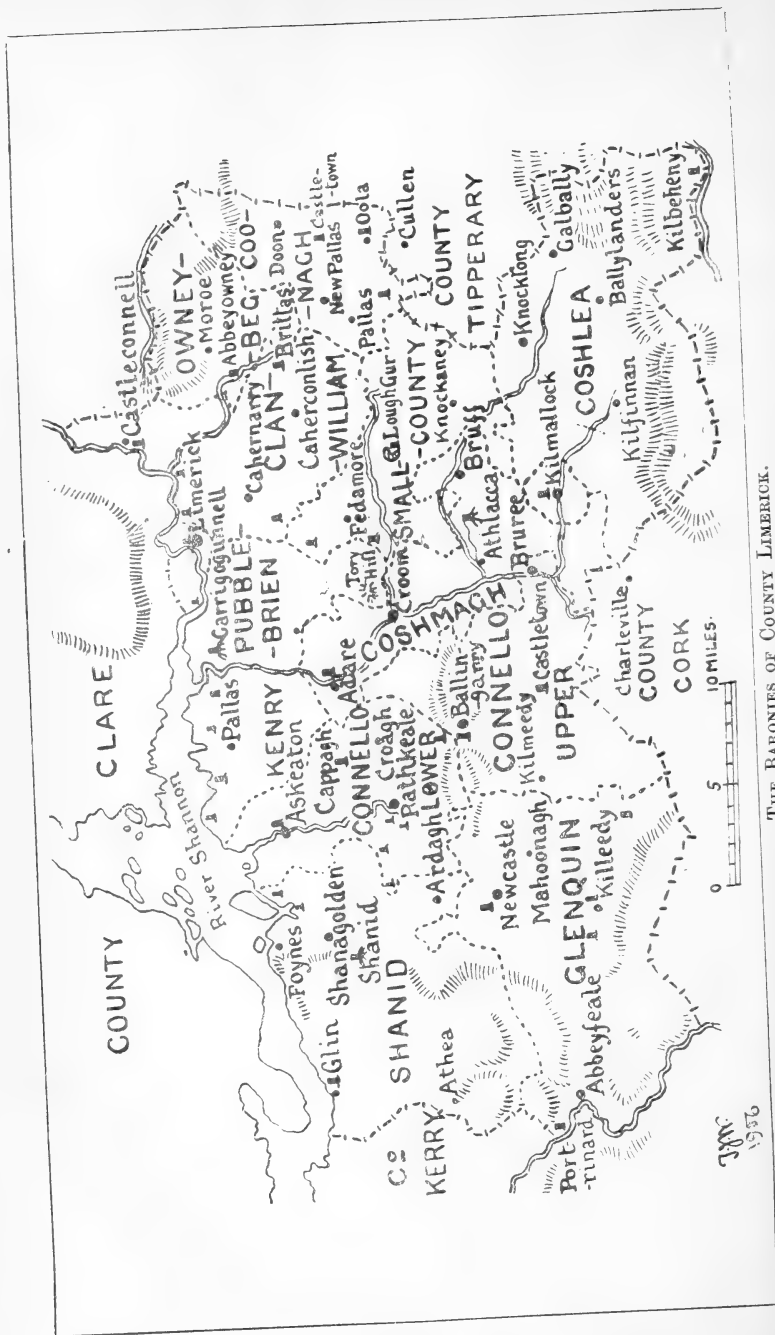
- Inq. . Inquisitions, *i.e.*, Exch., Exchequer; Chan., Chancery; the two series temp. James I. are lettered A and B.
- Len. . Lenihan. History of Limerick.
- O.S. . Ordnance Survey Maps.
- O.S.L. . Ordnance Letters, R.I. Acad.
- P.R.O.I. . Public Record Office, Ireland.
- R. . Rolls, *i.e.*, Pat., Patent; Close; Mem., Memoranda of Exchequer; Plea; and Acct., Account Rolls.
- R.I.A. . Royal Irish Academy.
- R.S.A.I. . Royal Society of Antiquaries of Ireland, under its various names.
- S. . Survey, *i.e.*, C.S. Civil; D., Down; O., Ordnance.
- Besides these we may note—
- Wars G.G. Wars of the Gaidhil with the Gail (ed. Todd).
- Wars Torl. Cathreim Thoirdhealbhaigh.
- Rentals. 1336, of De Rupefort. 1452, of Oconyll. 1540, of the Burkes.

A SURVEY OF THE CASTLES IN COUNTY LIMERICK.

LIMERICK CITY.

Little need be said on this subject. "Luimneach," an ancient name for the Shannon Estuary, and a tribe along its southern bank from the Maigue eastward, suggested to the Norsemen of the ninth century the name Hlimrek for their most western town. The Dalcassians held it more or less in subjection from the late tenth century for 200 years. It was then taken by the Normans, lost, retaken, and incorporated about 1195. Its subsequent history, its capture by the Irish in 1197, 1200, and 1369, and by the English in 1649 and 1691, is well known, and may be learned in the Histories by W. Ferrar, 1767; Rev. P. Fitzgerald and J. J. Macgregor, 1827; Maurice Lenihan, 1867; and the Rev. James Dowd, 1896, "Limerick and its Sieges."

1. KING'S CASTLE (Ordnance Survey Map 5). Stanihurst says that King John built an "egregium castellum" and a bridge there. The north-west or "Bridge" Tower is believed to be the oldest part.

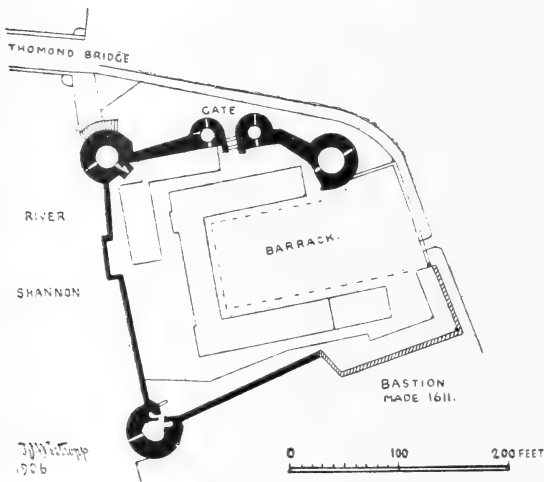


THE BARONIES OF COUNTY LIMERICK.

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The bawn of Limerick is named in 1200 (Ann. Loch Cé). There was a "castle there" in "1202" (Ann. Clon.). The fortress needed repair, 1216. In 1226 all the castles save Limerick were held against the king; but its custodian, Ric. de Burgo, was always willing to help the Government (C.S.P.I., No. 1443). It had been neglected, and the king's goods in it in 1224 were found to be scarcely worth 18 pence, "such as broken dishes" (*Ib.*, No. 1258). In 1227 the Justiciary was ordered to send a trusty person to spend 50 marks on its repair (*Ib.*, No. 1514). 1250 G. de Mareys, Justiciary, granted the presentation to its chapel to Bishop Hubert de Burgh (B.B.L., p. 29). 1272 John de Musegros accounts for cost of repairs of the bridge and C. (Pipe R. 1272). Money was granted for the food of the hostages in the C., also for building a new chamber, and paying two men to watch from the tower of the bridge towards Thomond, and archers on the tower at the head of the bridge (Pipe R. 4). 1297 A wall built in the C. (*Ib.* 25). 1318 The constable carelessly allowed fourteen prisoners (*sic*) to escape; but J. de Wogan recaptured sixteen, slew two, and permitted eight to abjure the realm (Plea R., No. 124, m. 37). 1310 Murage allowed for the city, and in 1322 for the C., and the repair of the walls and bridge (Pat. R.). 1326 T. de Winchester got a patent for the C., in bad repair, and grants of £20 and £80 for its buildings (*Ib.*). 1332 The hostages slew the constable, and held the C. till the Mayor and citizens recaptured it and put them to the sword (Ann. S. Mary's, Dublin, vol. ii., p. 378, and Book of Howth, p. 159). 1369 The city surrendered to the O'Briens and MacNamaras after the battle of Monasternenagh. Sioda MacNamara, who was left as Governor, was slain, and the Irish expelled (A.F.M.). 1417 Henry IV. granted murage (Pat. R.). The fees were "for the most part annihilated, and the C. ruinous," so £10 was granted from the city, and 40 marks from the Lexweir for the repairs (Pat. R.). 1427 The mayor and citizens petitioned that the C. might be given to their care, as it commanded the city, and had often been nearly lost by carelessness or treachery. This was granted conditionally on keeping it in repair (English Pat. R.). 1476 James, Earl of Desmond, made constable, and first took coigne and livery from the English (Carew i., p. 6). 1542 The possessions of the C. were found to be two gardens and the pasture of the King's Island, saving right of the citizens to enter for pastime there. It also took 10s. rent from the "Ile wear at Corbally," and dues from ships—1 measure of salt, 1 of wheat, 100 herrings or oysters, according to the cargo (Inq., Feb. 13, Len.,

p. 39). C. 1580 Maps and views of C. and town occur (Hardiman Collection, 1209, No. 57, T.C.D.).¹ 1600 Sir Geffry Galwey, the mayor, was fined £400, spent on repairs of C. (Pac. Hib. i., p. 198). 1611 Sir Josias Bodley reported that some of the towers were so undercut by the beating of the river, that a horse and cart could pass under them. He repaired these and the half towers at the gate, and made the south-east bastion² towards the city (Carew ii., pp. 214, 216). 1624 The C. ordered to be speedily repaired and fortified. 1626 The garrison consisted of the Governor, a porter at 9 pence, a cannoneer at 16 pence, and twenty warders at 8 pence each per diem (C.S.P.I.).



LIMERICK CASTLE.

1641 The English retired to the C., and after a severe siege surrendered to the Confederates on terms (Paper by M. J. M'Enery, R.S.A.I. xxxiv., p. 163). 1651 Surrendered with the city to Ireton. 1650-54 The C. underwent many repairs. Payments to the masons and assistant labourers "that wrought at Twomonth Bridge," and "worked at the greate C." appear; £9, for repair of the gates; Ant. Clogher and Edm. Dungan, Masons, "repaired the C. wall," and worked "on the old C." About £836 was spent on the fortifications (Acct. R. 12b-13b). 1672 Alleged plot of Capt. T. Walcott to

¹ Partly published, R.S.A.I., vol. xxxiv., p. 176

² *Ibid.*, p. 171.

capture C. by a mine from St. Nicholas' graveyard (C.S.P.I., 1672-3). 1691 In the siege a battery, ten guns and seven mortars, played on the bridge and C. It was surrendered with the city to Ginckell, and has since been continuously used as a garrison.

Fabric.—It was designed for defence towards Thomond and the bridge, and was poorly fortified towards the city, till the strained relations with the citizens compelled the Government in 1611 to make a bastion next the town. It has strong and lofty round towers to each of the north angles. The north-east tower is well preserved; but the "Bridge Tower" is scarred by cannon shot, and the upper part is removed. In the centre of the north curtain wall between two "half towers" is a fine gateway. There is a low round tower at the south-west angle next the river. The other buildings (save the curtain walls next the last-named tower) are modern. No detailed plan or description of this most interesting fortress is as yet accessible. For a striking sketch plan, see *Pacata Hibernia*.

2. THOM CORE. It stood in the Irish Town at the junction of Mungret-street and John-street, and appears in the 1580 map (Hardiman 57). 1402 T. Balbeyn, called "Cor," leaves in his will, dated March 28th, "my castle which I built in the suburbs of Limerick," leaving it to the Corporation, if his brother Henry, of Bristol, should not care to live in Limerick (Arthur MSS., Len., p. 236). 1650-54 Capt. T. Holmes repaired Core castle at a cost of £70. Also paid J. Tomson "for repair of Tom Core C." (Acct. R. 12b 13). 1657 It was held by Dr. T. Arthur, and was then a "cytadle" (C.S., xxviii., p. 6). 1659 The C. and the three citadels were garrisoned by 200 men (C.S.P.I., p. 687). 1668 Lord Orrery was granted the front stone house adjoining Tho: Core's C. (Act. Sett.). 1696 A market house ordered to be built on the site of Thom Core C., which is to be demolished (White MSS., Len., p. 295). This was done at a cost of £210.

3. ST. JOHN'S GATE. 1657 "The cytadle about St. John's Gate . . . a great stone house with a cross-house; the great castle on the gate, and a lardge waste plot" (C.S., xxviii., p. 10). It is also shown in some detail in the 1580 map as a tower two stories high, with two stepped gables, the gateway being underneath.

4. ST. MARY'S HOUSE. 1630 "The little C. pertaining to the house of the B.V.M." was granted by Edm. Sexten to Rev. N. Lillies for forty-one years (Inq. Chan. 219), along with a little close, and 40 feet of the body of a ruinous church (St. Mary and St. Edward of the Holy-

cross).¹ It was probably the Abbey steeple as shown in *Pacata Hibernia* and *Hardiman*, map 57.

5. THE CASTLE "CALLED THE SHAMBLES," in High-street, "made into a cytheadell, 1657" (C.S., xxviii., p. 1).

6. MR. FFILKINS CASTLE "near St. Marie's Church in High-street" (*Ib.*, p. 52).

7. STRITCHE'S CASTLE. 1657 "The stone C. or house of Alderman James Stritch, and a cross stone-house, now made a cytheadell or garrison" in St. Munchion's Parish (*Ib.*, p. 77).

8. GALWEY'S CASTLE, near the Cathedral. The family was a branch of the Burkes. "John de Burgo, of Galway, was knighted by Lionel Duke of Clarence, for his brave defence of Balls Bridge, Limerick, against the O'Briens, 1361."² The fine monument in the Cathedral dates 1414. Sir Geoffrey Galwey was Mayor in 1600, and strongly asserted the independence of the Corporation, being, in consequence, fined by Carew. He probably built the C., and died 1636. His grandson, Sir Geoffrey, was excepted from terms at the surrender of Limerick to Ireton, 1651. In 1650-54, Thomas White paid for work done in preserving Jeoffrey Gallowaye's House, £20" (Acct. R. 15). The "Castle" has been illustrated in *Journals R.S.A.I.*, xxiv., pp. 386-9, and *Limerick Field Club*, vol. i. It was demolished in 1894, being an object of prejudice from its name, "Ireton's House," and the Corporation refused to preserve it.

The City Gates may be here noted. They were—(1) Thomond Gate, (2) Island Gate, (3) Sallyport, (4) Little Island Gate, (5) Abbey Gate North³, (6) Fish Gate, (7) Ball's Bridge, (8) East Water Gate, (9) St. John's Gate (see above), (10) Mungret Gate, (11) West Watergate, (12) Creagh Gate, (13) Quay Lane Gate, (14) New Gate, (15) Gate at Castlebarrack. Of these only one now exists, incorporated

¹ I was misled by the "Histories" into separating, in my "Survey of the Churches of County Limerick," the "House of SS. Mary and Edmond" from that of "St. Mary and the Holycross." Different sites have been assigned by older antiquaries. See *Proc. R.I.A.*, xxv. (c.), pp. 360, 361. They are identified as the same house in *Inq. Chancery Car. I.*, No. 217.

² I cannot find any contemporary authority for this, but it is not impossible; and the tradition is at least as old as the later part of Elizabeth's reign. The fact that the bridge was held by Galwey's connexion, R. Bultingfort, about 1400, and by John Galwe, about 1564, tells in its favour. The date may be 1369.

³ In 1392 the north gate, with a small tower annexed, "empty, uninhabited, and uncovered," was granted to Ric. Bultingfort for life on condition of repairing it (*Pat. R.*). For the grantee's biography and monument, see *R.S.A.I.*, vol. xxvii., pp. 37, 44, 121.

with a wing of St. John's Hospital. It has an outer and inner arch, and a guard-room. One side of a gate remains to the north of Athlunkard-street, probably part of the castellated house shown there in Hardiman's map, 57. We omit the later citadel, batteries, and forts of the city and its besiegers in 1690-91.

9. CURRAGOWER. The weir of Coradoguir is named in 1201 in the Inq. M. f. Henry (B.B.L., p. 15). 1577 The mills of Cordower granted to Hercules Rainsford (Fi. 3027). 1627 W. Creagh f. Martin held the C. and two mills of Carrowdarrower in the parish of St. Nicholas (Inq. Chan. 50). 1657 Curragowr stone house and C. (C.S., xxviii., p. 64).

SUBURBS—TO THE NORTH OF THE SHANNON.

10. BALLYGRENAN, or CASTLE PARK (5). Site marked. 1610 David McCanney owned the C. of Parck (Inq. Chan., Car. I., 29). 1631 Pardon to Simon Fanning for alienation of the C. of Park in the County of the City (Pat. R.). 1655 Ballygrenane C. (Petty 63).

11. FARRANSHONE, or CASTLE BLAKE (5). Not marked.¹ It is possible that this may be one of the early castles called Blathac, the second being at Drogheda. 1218 Walter de Lacy held the C. of Drogheda, the land of Armail, and the C. of Blathac, near Limerick city (C.S.P.I., No. 835). The grants are equivocal, some giving Drogheda, Armail,² near Limerick, and C. Blathac (*Ib.*, 952, 953). The citizens of Limerick granted to Henry de Londres, Archbishop of Dublin, 1213-1228, and the Church of the Holy Trinity, Dublin, a carucate at C. Blathac, with the C., being one of the forty castles granted by King John to Limerick (Crede Mihi, lix. Lib. Nig. Alani, 579). Before 1248 the Archbishop granted it to Matilda, wife of W. de Mareys (C.S.P.I., vol. i., 2759). In 1624, Sir W. Parsons was confirmed in Castleblake or Castleblagh in the County of the City of Limerick (Pat. R.). 1633 Nic. Arthur held Castleblake or Farrenshone (Inq. Chan. 112); also in 1655 (C.S., xxviii., p. 83). It is not marked in Petty's map 63). 1666 Confirmed to Sir W. Petty (Act Sett.).

11. KNOCK (5). Not marked. 1614 Ardnegallagh and other lands held from the Corporation by T. Comyn (Inq. Exch.). 1655

¹ The phrase means that no site is marked in the townland in the Ordnance Survey maps. "Site marked" means that it is described as "site": "marked," that a "Castle" is named; "unknown," that the very place is not identified.

² Armail in County Tipperary.

Two peel towers marked at Knockardnegal (Petty 63). Cnockardnegalliagh held by Bart. Staepole and Jas. White (C.S., xxviii., p. 81).

13-18. CAHERDAVIN and other castles adjoining (5). Not marked. 1614 Cahirdavy held by T. Comyn (Inq. Exch.). 1655 Petty's map 63 shows the following C.s—(13) CAHERDAVINE, a peel tower with tall battlements, and a house attached; (14) CLONDRINAGH, a large tower; (15) CLONECANANE, a large tower, with side turret; (16) SHANABOLIE, a small gabled tower; (17) CLONEMAKINMORE, a battlemented tower, with a flagstaff; (18) CLONMACKINBEG, a battlemented house, with a tower to each side. None of these exist.

19. COREEN OR COONAGH (5). Site marked. 1655 Counnagh, a gabled peel tower, marked (Petty 63). It was held by Barnaby Earl of Thomond (C.S., xxviii., p. 79). *Fabric*—A fragment of the west wall, 18 feet high, 2½ feet thick, stood in 1840.

20. BALLYNANTYMORE (5). Site marked. 1665 It is probably the peel-tower of "Mollish" at Ballincaghtenmore (Petty 63); probably Mealish, held by Sir James White (C.S., xviii., p. 79).

21. CASHLAUN-NA-CORRAN (5). Marked. The Castle on the Laxweir, though assigned to County Clare, is in the middle of the Shannon, and historically belongs to Limerick. It is the lower part of an old building, retaining a sort of corbelled bartizan and some of the original window-slits, but evidently defaced and modernised. The Laxweir fisheries evidently date from Norse times. They were granted to W. de Braosa in 1215. Records are very numerous, but make no allusion to the tower.¹

SOUTH SUBURBS OF LIMERICK.

Two peel towers are so closely connected with Limerick that, though respectively to be assigned to Clanwilliam and Pubblebrian baronies, we may give them here.

ST. PATRICK'S.

22. REBOGGE, OR KING'S ISLAND (5). Not marked. 1590 T. Arthur at his death owned the C. of Rebogge or Reibieg (Inq. Exch. 14). 1633 Nic Arthur held Rebucke C. *Ib.*, Car. I., 112). 1657 T. Arthur held a ruinous C. there (C.S. xxix., p. 32, and D.S.A., 13).

¹ I hope eventually to deal with these fisheries, for which there is much material. Several have yet to be located: where, for instance, were Sownycockogyogeese and Sownygoockogybegshone, used down to 1624?

ST. MICHAEL'S.

23. COURTBRACK (5). Not marked. It is usually given with Corbally. 1377 Corbally granted for the repair of the Dominican House in Limerick (Close R., m. 20). 1583 "Veter Castell spect., voc. Courtebrack, Juxt. Civit. Lim." (Des. R., 7). 1586 Courte Brake, the parcell of land belonging to Monaster Donnogh Carbry or Monasterio Woghtro, was granted to the Earl of Desmond (Peyton, p. 182). 1586 Corbally was granted to Rob. Anstoe with Bealus, alias Courtbrack (Fi. 5837. Inq. Chan. 12 B). 1600 Jas. Gould held it with the Abbeys in the city. 1622 T. Gould enfeoffed Edm. England in same (Inq. Chan., 13 A). 1655 Courtebracke on the Shannon held by Barnaby Earl of Thomond (C.S. xxix., p. 23). Corbally is not to be confused with another Corbally to the north-east of the city.²

CLANWILLIAM.

This barony lies along the Shannon eastward from the city of Limerick and apparently corresponds roughly to part of Ui Chonaing and the ancient Aes tri muige, Estermoy or Nestermoy. "Smoothest of plains in the grassy territory of Ui g conaing, a bright watered plain of the noblest aspect, by the meadowy side of Craobh-Cumhráidhe" (Crecora), as O'Huidhrin describes it in 1420. Robert de Ufford in 1284 paid £40 for the rent of Estermoy. (C.S.P.I., p. 550). It is called Clanwilliam, after the Burkes, in 1466. They held it from 1201.

STRADBALLY.

24. CASTLECONNELL (1). Marked. There was a residence (or fort) called Caslaun Ui Chonaing in 1174, where Dermot and Mahon O'Brien were blinded by their relative King Donald. In 1200 Cathal Croiderg O'Conor and the Connaughtmen burned the bawn (Ann. F.M.). The next year W. de Burgo was granted Castle Canick. "If he fortify the castle," adds King John, "and we desire to have it, we will give him an exchange" (Ware). 1242 R. de Burgo held the manor of Castro Conign, worth £57 10s. 11½d. (C.S.P.I.). 1245 Phil de Inteberg, Constable of Limerick, is ordered to deliver up

¹ Several early notices relate to Corbally, County Lym. : e.g. Claricia, widow of Reymund Roch, claimed it 1296 (Plea R. 34, m. 64, where it is named between Keny and Caheravally); but I am not sure of identity in all these cases.

² See under Pubblebrian for Corbally.

Castle Coning (C.S.P.I.). 1261 It was destroyed by the Irish under King Conor na Siudaine O'Brien. 1272 and 1274 The manor of Castro Konyng, with C. Amory, Tristellaueran, &c., held by Walter de Burgo (Pipe R.). 1274 The King granted the C. to Theo le Butler. 1275 to T. de Clare. 1279 Butler was paid £100 for its loss (Close R.). 1285-7 de Burgo, the Earl of Ulster, and the men of Castroconyng harboured Terdeluath O'Brien (Prince of Thomond) before his raid on de Clare's lands at Cahirconlish and Grean (Plea R., and see Wars of Torlough). Walter de Burgo enlarged and strengthened it before 1299. In 1315 Castrum Congher wasted by the Bruces. (Wars of Torlough). 1317 Orders to Ric., Earl of Ulster, as to Castroconyn, &c. (R. Mem., m. 14). 1355 Ric. Bourke of Castro Conning licensed to treat with the Irish. From the Book of the Ui Mhaoilchonaire we learn its owners during the usually blank period of the later fourteenth and the fifteenth centuries. Walter Duff, son of Richard, made a partition of his lands (about 1400-1410); to his eldest son Richard, he gave Tiobraid Aronn (Tipperary), Caislean Ui Chonaing, and Cathair-Cinnleis; William, son of this Richard, held it *circa* 1450; his son Edm., *circa* 1490, and grandson William. The latter was knighted 1535. Pardon was granted to him in 1558; and, with his son Tybott, 1564 (Fiants Mary 274, Eliz, 902), he is described as W. Bourke mae Edm. of Kislaneyconnell, and created Baron Bourke of Castelconyll for his services against James of Desmond, 1580. Of his sons, Theobald fell in battle, 1578; three others were Barons in succession. In 1583 he held the "Castel et vill de Castleconell and fishing quarters" (Inq. Exch. Eliz. 9), called "Castel et vill de Ekonnell in Peroch. de Nester moy" (Des. R., 37). The Lords of Castleconnell play a large part in the local history thenceforward. William fought in the civil war, sat in the Parliament of Kilkenny, and went over sea to Charles II. in the Netherlands, "trailing a pike in the Duke of York's Regiment." The C. surrendered to the Commonwealth, 1651; for it and the weir and courts see C.S. xxi., p. 4, & B. D., 107. In 1690 it was surrendered by Captain Barnwell

¹ It is cited in a valuable, but scarcely known, Rental of the Burkes (T.C.D. H. I. 18), to which Mr. Standish Hayes O'Grady, and at a later date Mr. Hubert Knox, called my attention. The Rental deals with persons living about 1540. It has a quatrain in honour of Richard Saxonagh, apparently before his succession to the Earldom of Clanrickard in 1544. The present copy was made and possibly recast about 1617, as alluding to Tibot, son of Tibot, and Baron of Caislean, an I chonaing, *i.e.* to the first Baron of Brittas. It seems to have been compiled by David O'Bruadar from "Maoilchonaire's sons' Book."

to King William. On the retreat of the latter, the Irish occupied it till August 29th, 1691, when, after two days' siege, the garrison capitulated to the Prince of Hesse. Ginckell had the C. blown up soon afterward. William, the eighth Baron, fought for King James at Aughrim, and retired to France (Paper by James Grene Barry, R.S.A.I., vol. xix., p. 192, and numerous other works). 1725 Transferred by W. Ford to Ralph Westrop of Carduggan, County Cork (Dub. Reg.).

Fabric.—It stands on a steep flat-topped rock beside the Shannon. It is said to have had towers at each angle; traces remain to the south-west and north-west, with fragments of certain walls and well-built arches. The court measures 160 feet by 100 feet. Local tradition attributes it to the O'Briens and its destruction to Cromwell.¹

25. BALLYVOLLANE (6). Not marked. In Mountshannon demesne. 1540 The sliocht Edmond mac William Burke held Béal atha an mhuillin (Rental). 1586 C. Ballenvollin, by W. Bourke (Des. R. 37); 1623, by T. Arthur (Inq. Chan. 17A). 1627 The daughters of Pierce Creagh held in fee the C. of Biallaghmvolin (*Ib.*). 1655 Ballyweylan C., in Stradbally, Orchard, &c., by W. Lord Castleconnell (C.S. xxix. 3) Clehduph or Ballyvillan, Stradbally (D.S.A. 3). Ballywillin Clondenagh, with C. (D.S.A. 1).

KILNEGARRIFF.

26. CURRAGH (6). Not marked. 1657 Curragh-Elltine C. held by S. Molyneux (C.S. xxi. 4; B.D. 108).

27. KNOCKSENTRY OR CARRICKBEG (6). Not marked. 1540 Sliocht Shane mac William held the seisreach of Carraigbeag (Rental). 1583 W. Bourke, Knocknesomerta C. (Des. R., 37). 1621 Hubert Bourke C. of Cnockyuxputy and Carrigbegg and enfeoffed D. Mac Clanghie, a priest, in trust (Inq. Chan. 27B). 1624 Theo. Lord Brittas, C. of Cnock Iursinty. (*Ib.*) Livery to Hubert f. John Bourke license to alienate C. of Cnockyursinti for use of W., second son of Lord Brittas (Pat. R.). 1655 Leased by W. Bourke to W. Pope; the D.S. shows a peel tower on a rock (B.D. 108, D.S.A. 16 Petty, 65. 1666 Confirmed to W. Pope and partly to S. Molyneux (Act Sett.).

28. BALLYVARRA (6). Not marked. 1540 The man of Baile I Bharra was Seafruin (Geffry), son of Ulick (Rental). 1582 David, his grandson, of Ballyvarry C., was slain in Desmond's rebellion in Aherloe. 1583 W. Bourke held it (Des. R. 37). 1597 Pardon to

¹ The Down Survey sketch is given, Proc. R.I.A. (c.), vol. xxv., plate xii.

Gef. f. Ulick Bourke of Ballibarric (F. 6170). 1608 The mear of the liberties of Limerick included this C. (Inq. Exch.). 1655 Ric. Bourke sold the C. to Capt. T. Walcott; he also held the mill (C.S. xxix., 6 B.D. 108). 1667 Walcott confirmed in it (Act Sett.).

KILMURRY.

29. KILLONAN (14). Not marked. 1540 Clan Daug Bourke held Cil Lonain (Rental). 1583 W. Bourke, C. of Killonnan (Des. R., 37). 1589 Ric. f. Tho. Bourke, the two C.s of the Killonans (Inq. Chan., Car. I. 19). 1657 Two C.s named (D.S.A., 4 exp.). 1666 Granted to James Duke of York (Act Sett.). 1688 Shown as two towers three stories high, battlemented, and flanking a wing (Trustees' Map, 22). 1703 Sold to Hollow Blades Company.

30. CASTLE TROY (6). Marked. In 1197 H. Troy was first provost of Limerick; the family is often named. T. Troy, bailiff of Limerick, witnessed Edm. Wyndebald's will, 1361 (Arthur MSS., Len. 62). 1583 W. Bourke held Vill of Castlallane Trylane, C. of Callatroo (Des. R., 37, Peyton 257). 1610 Held by Mac Keough of Clonkeen, and 1655 the ruined C., eel weir, &c., of Callahintroy, by Lord Brittas (C.S. xxix., p. 8). 1666 Granted to Duke of York. 1688 Shown as standing in the Shannon (Trustees' Map, 22). 1703 Sold to Hollow Blades Company.

Fabric.—A peel tower on the bank of the Shannon. The north and east walls remain. It is $31\frac{1}{2}$ feet by $21\frac{1}{2}$ feet inside; the walls $7\frac{1}{2}$ feet thick, and about 70 feet high. It has five stories and numerous window-slits, and seems to date from later fifteenth century (see O.S.L., 9, p. 14).

31. SHREELANE OR DROMROE (5). Not marked. 1620 Edm. Bourke f. Ric. confirmed in Shrylane C. (Pat. R.). 1655 Sryelane and Dromruo with a broken C., held by T. Arthur (D.S.A., 4, exp. C.S. xxix., 10 B.D., 104). 1688 C., shown as a turreted peel tower in "Shrillane," on the Shannon bank (Trustees' Map, 22).

32. BALLYCLOUGH (6). Not marked. 1620 Edm. f. Ric. Bourke confirmed in half the C. and mill of Ballinlochic (Pat. R.). 1630 Livery of Ballinaclohy to Turlough mac Kennedy O'Brien (Chan. R.). 1655 Edm. Bourke, &c., unroffed C. (C.S., xxix., p. 10; D.S.A. 4 exp.). 1680 It belonged to James Whitro; the "etimology" is "Stone town" (Dyneley R.S.A.I. viii., p. 282). 1688 Confiscated as estate of King James (Trustees' Map, 30).

33. **NEWCASTLE-CLANWILLIAM** (5). Marked. 1583 Castelenoo C., held by W. Bourke, also called "Castellano Trylan" and "Nestermoy" (Des. R., 37; Peyton, 257). 1607 Dom. Roche owned Newcastle-Clanwilliam, meared with the water called Griodane on the west, and the Shannon on the north (Inq. Chan., 2A). 1619 H. Holcroft was granted the C. and bawn of Newcastle (Pat. R.). 1623-1655 Jordan Roche held it, with fifteen acres of orchard (Inq. Chan. II., C.S. xxix., p. 9), granted to Duke of York, and sold, 1703, to Hollow Blades Company.

Fabric.—A late peel tower; the west wall and a side turret had fallen before 1840; the latter, it is said, in 1800. It is about 50 feet high, and measures $27\frac{1}{2}$ feet by 21 feet 8 inches, with large windows and high gables and chimneys. An improbable tradition makes it the residence of King William during the siege of Limerick (see O.S.L., 9, p. 24).

DERRYGALVAN.

34. **BALLYSIMON** (13). Not marked; perhaps the last. 1540 Baile Simoinn was the land of Clann Daug; Beál Atha Siomuinn was land of Sliocht Riocard (Rental). 1583 W. Bourke held C. of Bellashemon (Des. R., 37), and in 1598, John Bourke. 1620-1623 Bealasymon held by his grandson Edm., son of Ric. Bourke (Pat. R. and Inq. Chan., 18A), who held it in 1655 (D.S.A., 4, C.S., xxix., p. 9, B.D., p. 104). Confirmed to Duke of York, and sold in 1703 to John Vincent.

35. **COOLYHENAN** (13, 14). Not marked. 1540 The man of Cúil I. Sheighinéin was Geffry, son of Rickard of the Sliocht Riocard (Rental). 1583 W. Bourke, Collehynon (Des. R., 37). 1595 Ullick Bourke died in possession of it and Kilpatrick. His son Ric. succeeded, and held it in 1637 and in 1655, with W. Bourke (Inq. Chan. Car. I., 2, 186, C.S., xxix., p. 11). 1663 Part was granted to Col. Randall Clayton, and the "Seven Stangs" to the Duke of York. The latter portion and Kilpatrick were held by N. Haly (Inq. Chan. Car. II., 4B. and Act Sett.). 1703 Kilkevane *alias* Cullyhenan, called the Seven Stangs, sold to T. Carter.

36. **KILPATRICK**. Unknown, but in Derrygalvan, near the east border of Donaghmore. See last section. 1655 N. Haly held the old C. somewhat in reparation (C.S., xxix., p. 13).

37. **BALLYNBROWNE**. Unknown. 1583 W. Bourke held its C. (Des. R., 37). 1621 H. Holcroft was granted the "ruined house of

Brownstown" (Pat. R.). 1655 there was a "stone house" there (D.S.A., 7 exp.).

CAHERNARRY.

38. CAHERNARRY (13). Not marked. 1207 Keyrnedyn, *alias* Carnarthy, is named in Prince John's Charter (B.B.L., p. 89). 1320 Suit as to Ric. Bagot's rights under charter of Ric., father of J. le Moyne, at Wallygard¹ in Carnarthy (Plea R.). 1540 Carran Fhearadhaigh in Burke estates (Rental). 1619 The C. and fort of Carnary granted to Holcroft, being late estate of George Bourke f. Tho. 1655 The lands with a C. and a beaune held by John Bourke, &c. (D.S.A., 7 exp., C.S., xxix., p. 16).

39. BALLYNEETY (14). 1619 Edm. Comyn held Whitestown C. At his death his son W. succeeded. 1655 Whitestown, *alias* Ballyneety, C. in Luidenbeg held by Lau. Comyn (D.S.A., 14, 26, C.S., xxi., p. 37). 1666 To Duke of York. 1702 To Alderman Rob. Twigg.

ST. NICHOLAS.

40. BALLYSHEEDY (13). Not marked. 1607 Jas. Fox, C. of Ballysheeda (Inq. Chan., 378), also in 1655 (C.S., xxix., p. 35).

DONAGHMORE.

41. RATHURD (13). Marked. The ancient Rathsuird, or Rathardasuird (Book of Rights). Rathsyward was a parish 1253 to 1418 ("Churches," No. 32). In 1583 J. Browne, C. of Rathwerde, well repaired, with an iron door, balne, pigeon-house, and other buildings (Des. R., 67B. See Peyton, p. 233). 1589 C. granted to Rob. Anstey (Fi., 5363). 1600 Held by N. Stritch (Inq. Ex., 11, Chan., 9A). 1606 N. Bourke and Ph. Field held in fee the entire C. of Rathuird, fishery, &c. (Inq. Chan. Car. I., 231). 1655 The lands held by N. and Jas. Bourke and Barth. Staepoll (C.S., xxix., p. 36). 1666 Grant to Capt. J. Friend (Act Sett.) and N. Rathurd to Capt. Winckworth.

Fabric.—A round C., square inside, 20½ feet internally, with four stories, the third floor being vaulted. It is about 35 feet high, the walls 13 feet thick at greatest mass. A nearly levelled rath lies 30 yards to north-west (O.S.L., 8, p. 160).

¹ Perhaps in Ballinagarde, now in Caheravally.

42. DROMBANNY (13). Two C.s marked, one in Donaghmore and one in Caheravally to south. 1584 Donnell Mac Canna, the lands (Fi., 4615), and in 1587 the C., which he entailed on his sons (Inq. Cha. Car. I., 90). 1621 H. Holcroft granted the ruined C., late estate of Edm. M^cCany (Pat. R.). Yet in 1629 livery on Drombanny was granted to Edm. M^cCanny on death of Donough, his father. (*Ib.*). 1655 Piers Creagh, f. Andrew, held the broken C. (C.S., xxix., p. 21, D.S.A., 7, 9). 1669 Granted to Duke of York (Act Sett.).

CAHERAVALLY.

43. DROMBANNY (13). See last for history.

Fabric.—The northern C. stands in a large, irregular double earthwork. The O.S. Letters describe Drombanny as a mere fragment of the south wall, 10 feet high on rising ground.

41. LICKADOON (13). Marked. 1336 Leakdon vill and "fossa"¹ held by Bishop Maur. de Rupefort (B.B.L., p. 138). 1351 W. de Bermingham held Nathirlagh, Athnedesche, and Lekedon (Pipe R.). 1581 W. duff Hurley, of Lickadowne, pardoned (Fi., 3768). 1585 Dermod O'Hurly, "Titular" Archbishop of Cashel, who had been born at "Lycadon," was executed in Dublin (O'Reilly "Memorials," p. 55). 1600 garrisoned by Carew (Pac. Hib. I., p. 86). 1607 Dom Roche, C. of Lyckadowne, *alias* Kiltourge (Inq. Chan., 2A). 1655 The C., bawne, and twelve cabins held by Jordan Roche (C.S., xxix., p. 19) granted to Duke of York, and in 1703 sold to Dr. T. Smith, Bishop of Limerick.

Fabric.—A peel tower, 70 feet high, 15½ feet by 7½ feet inside; walls, 8 feet 10 inches thick; the spiral stair in the eastern section, with the usual large gables and slit windows (O.S.L., 8, p. 151).

45. CAHERVALLY or RAHEEN (13). Marked. 1336 Rathendessy (de Rupefort's Rental). 1583 W ne Boyle, C. of Rahen, and J. O'Kahisse, the site of an "old very ruinous C. called Rahin (Des. R., 37F, 71). 1586 John Bradagh O'Kahysse held Raphin or Rathyn (Peyton, 214). 1623 Cahervahilly, by W. Roche (Inq. Chan. Car. I., 14). 1655 C. shown (D.S.A., 8). James II. created Dom. Roche, f. Jordan (Mayor of Limerick, 1691), Viscount of Cahiravahalla, and restored him the family estates. From Roche descended Sir Boyle Roche, of oratorical fame.

Fabric.—Foundations in a fort behind the church.

¹ "Fossa" means an entrenched earth fort or mote, and may be the "dun" which gives the name to the place.

46. BALLINAGARDE (22). Not marked. 1320 Probably Wallýgard in Carnarthy (see 39, *supra*). 1540 Baile na cceard, estate of Maolire Burke (Rental). 1567 Held by Ulig Bourke (Fi., 1050). 1583 Ballynogerd C., by W. Bourke (Des. R., 27). In 1587, his son Edmond entailed it on his sons Walter and John (Inq. Chan., Car. I., 53b). 1632 This Walter settled it on his sons Walter, Theo., and Edm., and died 1633 (*Ib.* 111). Theo. was transplanted, 1653. He had married Marg. Lysaght, and owned the C., 1655 (C.S., xxi, p. 35). 1653 Capt. Faithful Chapman held C. (Acct. Bk.). 1680 Dyneley (*loc. cit.*) sketched it, and shows a peel tower four stories high. He tells how a daughter of the Bourkes sprang from a window 16 yards high to escape a forced marriage. "She afterwards married the man she so avoyded, and lived happily." It belonged 1680 to John Croker, J.P., in whose family it since continued. We leave to students of folklore the curious legends of Satan's visit to it.

FEDAMORE.

47. WILLIAMSTOWN (22). Marked. Perhaps Ballywillin¹ C., 1583 (Des. R., 37). 1625 Theo. or Tibbott Bourke, Williamstown C., except the "Geist Hall" (Inq. Chan., Car. I., 11). 1636 John, his son, held a room in it, with the bawn and a stone house in the north part of the C. (*Ib.*, Car. II., 180). 1655 Lord Brittas, Dr. T. Arthur, and others claimed the C. and bawen (C.S., xxi, p. 35). 1666 Granted to Col. Clayton and W. Matthews, except the middle story, confirmed to Dr. Arthur's daughters (Act Sett.).

Fabric.—Fitzgerald describes it as a tower without outworks (I., p. 297). It was repaired and modernised by the Crokers, so O'Donovan failed to find it in 1840 (O.S.L. 8, pp. 151, 366).

ROCHESTOWN.

48. ROCHESTOWN (22-23). Not marked. 1540 Baile an Roisigh estate of Clann Daug (Rental). 1583 W. Bourke, Castel Roche C. (Des. R., 37). In 1655 it is called Longford (D.S.A., 14). 1666 Confirmed to Col. Clayton, and 1678 to Dr. Arthur's heiresses (Act Sett.).

49. ROCKSTOWN² (22). Marked. 1583 Ballynecarrig C. held by W. Bourke (Des. R., 37). 1600 Jas. Gould held C. of Ballynecarrygie

¹ Its identity with Ballywillin is uncertain, as "Ballinwilly" was an *alias* for Carrigparson (see section 58, *infra*).

² Rockstown Church was omitted in the Survey—Proc. R.I.A., xxv. (C.), No. 8. It has since been described and illustrated by Mr. J. Grene Barry in the Journal of the Limerick Field Club, vol. iii., p. 38.

or Rockstowne (Inq. Chan., 40B). 1655 Capt. G. Ingoldesbye held C. and bawn of Ballinacarriggie (C.S., xxi., p. 35), Ballinecarrig (D.S.A., 24).

Fabric.—A tower standing on rocks, with a wide outlook. It is 50 feet high, measures 26 feet by 24 feet inside, and has four stories well preserved (O.S.L., 8, p. 366). Views in Du Noyer's sketches, R.S.A.I. collection (iii. 41A, iv. 62).

CAHERELLY.

50. CAHERELLY, WEST CASTLE (23). Two castles marked. 1283 Suit of J. de Norragh about Catherelny (Plea R.). 1323 And of Almeric de Bellofago and T. f. Rhys, about Milltown watermill there (*Ib.* 139, m. 23). 1583 "Carelii duo castell," by W. Bourke (Des. R., 37). 1599 Tadeus O'Heyne died, seized of the C. of Caherely-en-temple. 1622 His son Conor died, whose son Donat entailed the C., hall, bawn, and vill of Le Caherelly (Inq. Chan., 69B). 1629 He was pardoned for alienation of Caherelly West (Pat. R.). 1655 Dan Heyne held it (C.S., xxi., p. 28). 1667 The C. of West Caherelly confirmed to Sir W. King (Act Sett.). The connexion of the O'Heynes, however, subsisted to at least 1748, when it is noted that Hynes of Cahirelly and Clanchy of Ballyvorreen were the only gentry between Ballinaguard and O'Brien's Bridge who were not Burkes (FitzG., vol. i., p. 284).

Fabric.—A peel tower, 60 feet high and 20 feet wide (O.S.L., 8, p. 346).

51. THE EAST CASTLE (23). Usually called the "Black Castle." This was the O'Heynes' residence; it was repaired by Mr. Hannan before 1826, and was levelled before 1840.

52. BALLYBRICKEN, SOUTH, "The Court" (23). Marked. 1540 Baile Ibricin, held by Ric., brother of Maoilre Burk of Ballinagard (Rental). 1584 Donnell O'Heine held it at his death; his sons David and Edm. divided the land, but not the C. (Inq. Chan., Car. I., 96). 1655 Held by Con Clanchy. Shown as a broad tower gabled and battlemented, with a house attached (D.S.A., 22, C.S., xxi., p. 29). Granted to Sir G. Ingoldesbye; his wife was a daughter of James Gould, and his wife, heiress of Sir T. Browne of Hospital, and widow of Alex. Fitton. R. Ingoldesbye of Ballybricken C. was attainted by the Parliament at Dublin, 1689 (see Act Sett., &c.).

Fabric.—The "Old Court" was 50 feet high and 16 feet wide, the walls $7\frac{1}{2}$ feet thick. It had four stories, the lowest being vaulted (O.S.L., 8, p. 348).

INCH ST. LAWRENCE.

53. INCH ST. LAWRENCE (14). Marked. 1242 Named as the manor of Tristellaueran (C.S.P.I.). 1272-74 Walter de Burgo held it with Castr' konyng (Pipe R., 1 and 3). 1309 Fine of Ric. de Burgo, Earl of Ulster, on manors of Esclon and Tristellauerans. 1327 W. Burke, his cousin and heir, got living of same. 1410 Emon, second son of Walter Duff Burk, was, by his father's disposition, given the four seisreachs of Disert Labrais, and the four of Garran ui chiabaigh in Aes-tri-muighe (Rental). 1558 Tho. mac Ric. Bourke held Dysardelowrowe in Clynelyum (Fi. 274). 1583 Perhaps C. and vill of Inshe (Des. R., 8). 1641 Theo. Lord Brittas settled it on his mother, Margaret, widow of John Baron of Brittas, the C. of Grenanbeg with Knockruo and Enishenlawrence, Knocktanacastlane C., Dunemona C., Rathjordan and Castle Troy (C.S.P.I., 1660-62). 1655 Inshenlawrence held by Cormock Heyne (D.S.A., 13; C.S., xxi., p. 30). 1703 Sold as estate of Lord Brittas to the Hollow Blades Company.

54. KNOCKROE MASON, "Court" (23). Not marked. Perhaps Castellknocke, 1583 (Des. R., 37), but doubtful.

Fabric.—In 1840 a mound of fallen stonework was called "Shancuir" (O.S.L., 8, p. 361). We find no certain records.

LUDDEN.

55. KILCULLINE (14). Not marked. 1583 Kyllkollen C. held by W. Bourke (Des. R., 57). 1623 Pardon to Jasper White for alienating C. to J. Roch (Pat. R.). 1624 Stephen Roch held it (Inq. Chan. 24A). 1655 C. and bawen held by Ingoldsbye. Kilcowlin is shown as a tall tower, with high gables and chimneys (D.S.A. 26, C.S., xxi., p. 38); not to be confused with Kilcullane in Small County.

56. BALLYMACREESE (14). Not marked. 1621 H. Holcroft was granted C. and bawn of Ballym^rrice in Clanwilliam (Pat. R., No. xxxiv.). 1668 Granted to Duke of York. 1703 Sold to Abraham Greene.

57. LUDDENMORE (23). Not marked. 1540 Maoilre Burk of Baile na cceard held Lodan mór (Rental). 1583 W. Burke held the C. (Des. R., 37). 1600 James Gould¹ died in possession of it

¹ He also held the Dominican Convent in Limerick, and Corbally Castle.

(Inq. Chan. 408). 1652 John Burke owned it and was transplanted
1655 Held by Ingoldesbyé. Fitzgerald names it as a "strong"
1826 (vol. ii., p. 289).

CARRIGARSON.

58. CARRIGARSON (14). Not marked. 1583 Ballywillin C. held
by W. Burke (Des. R., 37). 1619 Holcroft was granted C. of Carrig-
arson or Ballenwily (Pat. R.). 1624 Pardon to Anselm O'Brien
for alienating C. of Carrigarson to Hollenwily to W. (Inq. Chan.
1618 B.). He and his wife held the C. and bawn in 1624 (Inq.
Chan. 23A). 1655 A ruined C. (D.S.A. 6 exp.).

59. TOOREEN (14). Marked. 1540 Tuairín held by Shocht
Riocard (Rental). 1586 By Geffry beg. mac Tho. Bourke
(Peyton, 256). 1622 The ruinous C. of Tuorin granted to Sir
W. Parsons at part of late estate of Jas. Riordan (Pat. R., 1622)
Held by N. Haly (O.S., xxix, p. 14 D.S.A.I., 9). 1668 Condemned
to Clayton (Act. Sett.).

Fabric.—The north wall 25 feet high, 21 feet wide, and four feet
thick (O.S.L., 8, p. 154).

CLONKEEN.

60. CLONKEEN (14). Not marked. 1589 Edm. Sexten served at
Clonkeny C., County Limerick (Arthur MSS., Len. 1655 There
stand a church at Clonkeene and a C. (D.S.A. 17 exp.).

CAHEROONLISH.

61. CAHEROONLISH (14). Site marked. 1199 Kakinles C. was
commenced. It was held by Theo. Walter le Botiller in 1216
(C.S.P.I.). 1289-7 Cathair-Kind-lis "rampart guarded, solid
stone," with vaulted towers and drawbridge, stormed and burned
by Turlough O'Brien, Prince of Thomond (Wars of Toti., Pies R.).
1398 Murage allowed the provost and bailiffs of Catheroonlish to
build a stone wall round the town, which was on the marches with
Irish rebels on every side (Close R.). 1358 Edward III. gave it a
charter (Pat. R.). 1589 W. Bourke held C. (Des. R., 37). 1605
It was leased by Lord Oaker to Theo. Burke (Act. Sett., p. 17).
1641 Monument to latter and his wife, Siang Eben, erected
in church. 1680 Dynaley sketched the church and peel tower

(R.S.A.I. ix., p. 197). 1690 It was occupied by King William, and in 1691 by Ginckell, when advancing to besiege Limerick.¹

Fabric.—Fitzgerald mentions four C.s in 1827, and a fortified gate (vol. ii., p. 285); little is now extant. Dyneley's view shows a peel-tower, four stories high, with a bartizan at one corner. See a paper on the place in Cork Hist. and Arch. Journal, vol. ii., 1896, by Rev. Mr. Lynch.

62. **KNOCKSHANECASHLANE (14).** Marked. 1540 The man of Cnoc an t sean chaisléan was Shane (m. Ric., m. Tiboid, m. William, m. Ric., m. Water, who owned it, in 1410, greatgrandson of Ric., 1349), Burk (Rental). 1583 W. Burke, Knockesanna C. (Des. R. 37), or Cnockentanycaslane with a C. and water-mill (Inq. Exch., 23). The C. in 1608 was granted to Theo. Lord Castleconnell (Pat. R.), confirmed 1633 to Lord Brittas. 1655 Cnocke Senechullane (C.S.P.I. and C.S., xxi., p. 10; also see D.S.A., 14–18), and confirmed 1666 to Capt. Friend (Act Sett.).

Fabric—Fitzgerald calls it “a fine old fortress near the residence of B. Frend,” 1827 (vol. ii., p. 286). The O. S. Letters say that no ruins stood in 1840; but the maps show a large enclosure, with a small round turret at the north-east angle.

63 and 64. **KNOCKEDANNA C. AND CASTELLENOCKE C.**, given, as held by W. Bourke, with the last-named C., in Cahrynlisshy 1583 (Des. R. 37), but are otherwise unknown to me.

65. **GRENAN (14).** Two castles marked. 1540 Shane Burke gave the half seisreach of da Grianán to MacClanchy of Urlann, County Clare (Rental). 1557 F. f. Donnell f. Glangie, of Grenan, got English Liberty for 6s. 8d. (Fi. 1903). 1583 W. Burke held Grenane “duo castell” (Des. R. 37). 1604 Theo. Baron Bourgh of Castleconnell was granted half the C. of Grenan Ieghtragh, estate of Don. mac Clanchie (Pat. R.). 1608 He was confirmed in C. of Griananbeg (*Ib.*). 1624 Sir W. Parsons was granted Grenan Oughteragh, estate of Owen and Don. Clansy (*Ib.*). Livery granted to Tho. Clancy, and pardon for alienation of C., and bawn of last (*Ib.*). 1651–4 There was a Cromwellian garrison at Greenane (Acct. R., 7 B). 1655 Lord Brittas held both C.s of Grenane—Ighteragh and Huaghtragh (C.S., xxi., pp. 11, 12; D.S.A., 14–18; B.D., p. 129), and Owen, John, Charles, and Simon Clanchy joined him in conveying same to A. Ingram (B.D.,

¹ The Wilson family of Caherconlish came from Elton, Yorkshire. Col. Ralph Wilson obtained Caherconlish with Kishiquirk, Tervoe, &c., and built a fine house at the first, now long a ruin. The “irresponsible forms” of the name require care, unintelligible forms reaching their nadir in “Rare Kenlex” in 1575.

p. 129). 1666 Confirmed to last (Act. Sett.). 1669 Granted to Duke of York. 1703 Sold to Hollow Blades Company.

Fabric.—It stood on a small hill, and was levelled before 1840.

66. GRENANBEGG (14). See above. It is Grenan Ightragh, and in 1608 John O'Hea enfeoffed N. Lyly in it (Inq. Exch. 23).

67. KNOCKANEA (14). Not marked. 1583 W. Bourke, Knockeneff C. (Des. R. 37). 1607. Lord Castleconnell was granted C. of Knockanneagh (Pat. R.). 1655 Knockneneagh held by Lord Brittas, a large tower with a side wing shown (D.S.A., 14, 18, exp.; C.S., xxi., p. 10). See *infra* under "Brittas." 1663 John Freind to Lord Brittas, saving rights decreed (Act Sett.).

68. BALLYVORNEENE (23). Not marked in 1840, but appears at the modern house on the new maps. 1651-54 Ric. Kirle paid for "hey" for the horses of the garrison of Ballyvorneene (Acct. R. 7B). 1655 Held by Conor Clancie. Shown as a strong tower, with large gabled wing attached, "a very fair C., in good repair" (C.S., xxi., p. 16; D.S.A., 14, 18, exp.). 1667 Confirmed to J. Maunsell (Act Sett.). See *infra*, under Caherconreiffy. Consider Peyton's mention of Ballyvorheen C. in O'wney (O.S., 15), section 85, *infra*.

69. SRAHANE (14). Not marked. 1583 W. Bourke holds Srahan C. (Des. R., 37). 1620 Sir Jas. Craige confirmed in C. of Shrohane (Pat. R.). 1624 Pardon to Anselm O'Brien for its alienation to W. Creagh in 1618 (Pat. R.). 1655 A low tower and side wing shown. Srughane C. held by Lau. White and Dom. Creagh (C.S., xxi., p. 15; D.S.A., 14, 18). 1666 Confirmed to Capt. Friend and Dr. R. Boyle, Bishop of Ferns (Act Sett.).

70. CASTLE ERKIN (14). Not marked. 1237 A Scotch merchant, Erkin, got license to trade in Ireland (C.S.P.I., 2424). Castlelurkan appears in several Elizabethan Fiants (4935 and 6513). 1604 J. Burke held C. at his death (Inq. Chan., 29B); 1630 Livery on death of said J. Bourke to his son Walter (Pat. R.). 1638 Edm. Lord Castleconnell at his death held C. (Inq. Chan., 216). 1655 W. Borke held it (C.S., xxi., p. 14; D.S.A., 14, 18). 1662 Capt. Alex. Downing and his wife Una, dau. of late owner, T. Bourke, claimed it (C.S.P.I., 1660-2). Part of it was confirmed to Ulysses Burgh.

71. CASTLE UILCHIN. UNKNOWN. O'Donovan identifies it with last, but gives no authority (A.F.M.). 1200 Cathal Crovdearg O'Conor invaded Munster and plundered Castleconnell, the marketplace of Limerick, and Caslan Uilchin. He carried off Uilchin¹ and

¹ In 1212 a certain Wilekin, messenger of Geoffry Luterell in Ireland, was given four shillings, by King John, as a present (C.S.P.I., No. 431).

his wife, and slew thirteen knights and others (A.F.M.). 1242-3 Ric. de Burgh held the manors of Castle Wilekin, Balihodan, and Tristel-laueran (C.S.P.I.). 1281 J. de Saundford accounts for rents of Esclon and Castle Wyleken; the latter was let to farm to Ric. f. Walter de Burgo (Pipe R., 8).

72. CARRIGAREELY (14). Marked. Fitzgerald calls it Carrig-farrioyla, "the O'Farrellys' rock," and says it was built by the Bourkes and occupied by the O'Dalys (vol. ii., p. 286); O'Donovan denies this, and says it was Carraig Fearghaill, Farrell's Rock (O.S.L., 8, p. 408). 1558 Sussex on his progress was entertained with drink by W. Burke as he passed the C. of Carrec Kerellois (Carew, i., p. 274). 1567 Pardon to Theo. Bourke of Carrygkyrily (Fi., 1050). 1576 Theo. died in possession of Karriarilie or Karrigkyrely (Inq. Exch., 9). 1655 Carrigiriell held by Lord Brittas. C. shown (D.S.A., 14, 18; C.S., xxi., p. 10).

Fabric.—It stood on a rock 20 feet high, and was fairly perfect, being about 70 feet high, with five stories, the fourth floor over a vault. It measured 19 feet 8 inches, by $14\frac{1}{2}$ feet inside. Walls $6\frac{1}{2}$ feet thick (O.S.L., 8, p. 408).

73. BRITTAS (14). Marked. It was a chief seat of the Bourkes, Barons of Brittas. In about 1410 Walter Duff Burk assigned to his third son, Tiboit, the seisreachs of Britás, Rath Siurtain, Carraig Ciotal and Baile Loisgeche. Tibbot had two sons, Riocaird and Daibhi, who gave their names to families (Rental). Ric. Bourke, brother of Lord Castleconnell, left by his wife (a daughter of O'Mulryan, of Owny) a son, Sir John, who, in 1600, at the approach of Carew, offered to surrender. He, however, "considered it sinful and damnable personally to submit" to the Queen; so Carew forced him into an ignominious surrender. In 1603 he was imprisoned for refusing the oath of supremacy, and on his release, held the C. against the Government. After a brave defence of fifteen days he fled to Waterford, and was taken, tried, and hanged. His kinsman, Theo. Burke, was given Bryttas and Knockeneagh (Inq. Exch. 23, and paper by J. Grene Barry, R.S.A.I., vol. xix., p. 192). 1609 Theo. "Lord Castleconnell" was granted the C. (Pat. R.). In the following year he gave much trouble by "his perverse carriage" in trying to seize the lands and title of Lord Castleconnell. It was only by seven months' imprisonment that the Government persuaded him to renounce his claims (C.S.P.I., 430). He was created Baron of Brittas, and in 1633 was confirmed in it and other lands, Knocketencaslean, Grenanbeg, &c. (*Ibid.*). 1653 Brittas was a garrison: Henry Hayward was paid

£5 4s. for its repair (Acc. R., 13B). 1657 Two towers shown (D.S.A., 14-18). Theo., the third Baron, was transplanted and his estates granted to Sir Charles Coote. Charles II. reversed the attainder before 1662. 1673 Elton and Brittas were vested in R. Reading, for use of Countess of Mountrath, under her husband's will, 1658: reversion to R. Coote (Act Sett.). 1691 Lord Brittas fled to France, his estates being forfeited. He succeeded to the titular honours as Lord Castleconnell, and served in Irish Brigade; his son John succeeded, and was a captain in the French army, the younger son Thomas being a general in Sardinia, a "noble-hearted and generous friend to all Irish exiles," and died 1788. His son was a Knight of St. Louis and a captain, and died unmarried about 1796.

Fabric.—The C. stands on the west bank of the Mulkear. There are round turrets to the south-west and north-west angles. Each is about 40 feet high, 16 feet inside, and the walls 5 feet thick. The curtain wall between them is 84 feet long and 25 feet high (O.S.L., 8, p. 409. Paper by Mr. J. Grene Barry, R.S.A.I., vol. xix., p. 192).

RATHJORDAN.

74. RATHJORDAN (23). Not marked. It was probably named after a Jordan Roche. 1287 W. Roch, of Rathjordan, fined (C.S.P.I., 155). 1412 Rath Siurtain (Burke's Rental). 1583 N. Bourke held the C. (Inq. Exch., 18); James McGerrott duff Marshall held, at Rathjordan, a hamlet, ruinous C., and lands; he joined the revolt of the Earl of Desmond, and was hanged by Lord Ormond (Inq. Exch. 32). 1603 Sir Ric. Boyle was granted the old ruinous C., late estate of James Marescall (Pat. R.). 1655 Lord Brittas held it (C.S. xxi., p. 27).

AGLISHCORMICK.

75. CAHERCONREIFY (23). Not marked. 1297 Catherconrewy held by Mariota, wife of Phil. Kemys (Plea R., xxv Ed. I., 31 m. 16). 1583 W. Bourke, C. of Karconroeiffie (Des. R., 37). 1619 It was granted to Holcroft (Pat. R.). 1655 W. Bourke held C. (D.S.A., 20, C.S. xxi., p. 22). 1667 Granted to J. Maunsell (Act Sett.). 1693 G. Maunsell, of Ballyvoreneen, conveyed it to S. Edmondson, in lieu of a legacy from his father, J. Maunsell, to latter's daughter Mary Edmondson; see Deed, 1715 (Dub. Reg., B. 20, p. 410).

DROMKEEN.

76. DROMKEEN (24). Not marked. 1250 John Pincerna (Butler) granted Dronchyn to augment a prebend (B.B.L., p. 105). 1280 The sheriff ordered to hold a sworn enquiry about land of Dromken, held by Silvester Architedekne (Mem. R. Exch., No. 438). 1322 Suit of J. Harold and Paul de Hynterberg, about Drumkeyne, of which John, Paul's father, had disseised Harold (Plea R., 142). 1399-1400 The custody of estates of Ric. Harold, in Drumkyn, disturbed by Katherine, his widow (Mem. R., No. 26). It is alleged that the de Burghs, descendants of John Bourke of Shrule, son of Walter, *circa* 1410, and Sabia, his wife, daughter of Conor O'Brien, Prince of Thomond, settled there in first half of fifteenth century and held it to recent times. 1583 W. Bourke held Dromekyn C. (Des. R., 37). 1585 His son Ric. held it. 1619 C. and bawn granted to Holcroft. 1633 W. Bourke still owner (Inq. Chan. 93). 1655 C. shown (D.S.A., 14; Petty, 65). 1691 Right Rev. Ulysses Burgh, Bishop of Ardagh, died—buried at Drumkeen. 1717 Church and monument repaired by Rev. Richard Burg. He calls it "the burial-place of his family from time immemorial."

ABINGDON.

77. LISMOLLANE (14). Not marked. 1540 Sliocht Edmond MacWilliam held Lios Mothlain with Lodain beág. Maoilre Burk held Lios Mothlán beág (Rental). 1583 It was held by W. Bourke, Lysmollan C. (Des. R. 37), and in 1623 by Ric. fitz Tho. Bourke (Inq. Chan. 50B). 1655 Lismollane or Lismulhane C., shown as a low, battlemented tower on the Mulkeare (C.S. xxi., p. 41; D.S.A., 1, 3).

78. KISHIQUIRKE (14). Not marked. 1597 Held by Ulick Bourke (Fi. 6170). 1655 Kishiquirke and Cloughnadrumone "each a C." It is shown as a tall peel tower, and named twice in explanation (C.S. xxi., p. 42; D.S.A., 3, 27, exp.). 1718 Ralph Wilson held it (Dub. Reg., B. 48, p. 100).

79. CLOUGHNADROMIN (14). Not marked. 1641 John Burgett held Cloghenn Drummin (Dep. 134). 1655 The C. and mill of Cloughdrumon, Cloughnadromin, and Cloughidrumon (D.S.A., 14, 27, and exp.; Petty, 65).

OWNEYBEG.

This barony, with its complement Owey and Arra in County Tipperary, forms the great tribal district of Uaithne or Uaithne Cliach.

The Normans in the latest twelfth century called it by various approximations to the native name—some unaspirated like Huerthern, Wetheny, and Wodeny—others from the aspirated form, as Yonach, Huheny, Honey, Woney, and Owney. 1201 W. de Braosa grants to Theobald Walter, Kildelo (terra de Munester), Eurmun, Areth, and Wetheni, with Owethenihokathelan and Owethenihoiffernan, as granted to his uncle Philip de Braosa.¹ At the foundation of the great Cistercian House of Owney, probably before 1200, the district appears as Wodeny O Cathelan, Wodeny Oiffian, and Wodeny Fidenurde. The Manor of Wethenicire was worth £8 3s. 3½d. per annum in 1242 (C.S.P.I.). It is “Uaithne-tire of fruit, under Makeough” in the Topography of O’Huidhrin in 1420. The Ui Cathalain and Ui hiffernan tribes and the Aradha were gradually displaced, though the nominal English power hardly reached past Caherconlish.

By 1420 the Ui Maolrians or Ryans were supreme in the Limerick portion of Uaithne, and gave it their name of Woney Mulryan down to the seventeenth century.

ABINGDON.

80. AGHACORE OR BOYNAGH (14). Not marked. There seems to be some doubt whether the Boyanagh “in Natherlach,” 1291 (Papal Taxation), was really in Wetheny, or whether it was the Kilboygnan church near Ballingarry in Coshlea (Plea R., No. 22 and No. 26), named in 1297 and 1306, as we believe it to be. If not, the records of Boynagh, and certainly those of its castle, only commence in 1552 (to our present knowledge); the Abbey of Woney, Caslaneboenagh, &c., being granted to Walter Ap. Howell or Powell (Fi. 1020). They also appear immediately after the Abbey in the following grants:—1562 to Peter Walshe, of Grange, Kilkenny; 1592 Confirmed (*Ib.*, 463 and Inq. Exch., 36). Livery to Edmond, son of Peter. 1620 On death of said Sir Edmond Walshe, the C., vill, and lands of Castleneboenagh, *alias* Aghcore, are named (Inq. Chan., 151 and 22B). John Walsh was pardoned for alienation of Castlenebony, *alias* Aghoy, and Carpinullen, &c. (Pat. R.). The name is not found in the great surveys.

81. CASTLECOMFORT (14). Marked. This is very probably the last-named. In 1840 the house was said to stand on the site of an old castle (O.S.L., 8. 444). It adjoins Aghacore, and “core” may have

¹ National MSS., Ireland, II., No. lxvii.

been taken for "cobhair," assistance, relief, or [in the old sense] "comfort."¹

82. CAPPACULLEN and CAPPANOUK (15). Not marked. The last townland includes the deerpark of Glenstal. 1553 The townland of Keapenock (Inq. Exch., 1 of Mary). They are named with Castle Boenagh in the grants of 1552, 1562, and 1592. 1569 Pardon to Henry Mac Lysagh Omulrian, of Keapeycullen (Fi., 1342). 1604 Grant to Theo. Baron Bourgh, of Castleconnell, the C. of Cappencullen, part of estate of Conogher, mac Edmund, mac Lysagh, O'Mulrian (Pat. R.). 1625 Cormac Mac Gorman held it (Inq. Chan., 26). 1655 The C. is shown in "Capullen" (D.S.A., 28, Petty, 66). The townlands of Skartt, Keapanewke, Keapacullin, and Laghane, with a C. of Col. Piers Welsh (C.S., xxx., p. 3; B.D., p. 113). The castle stood in the north-east end of Cappacullen, near Moroe. 1666 Rob. Wilkinson and Simon White confirmed in Glanstall and the moiety of the C. of Cappercullen. 1667 George Evans was granted Cappercullin (Act Sett.).

83. ANNAGH (6). Not marked. 1592 Held by Peter Walsh. See also grants 1552-1592. In 1619 Conor Mulrian held the C. at his death (Inq. Chan., 36B). 1655 John Ryan held C. (C.S., xxx., p. 5, and D.S.A., 28). Col. Piers Walsh is stated to have owned it (B.D., p. 113). It is shown in the D.S. as having two turrets.

84. KNOCKYURTEENY (6). Not marked. See 1552, 1562, 1592 grants. C. named in Inq. Exch., 36. Townland only in Surveys (C.S., xxx., p. 2). A doubtful site.

85. BALLYVORHEEN (15). Not marked. 1586 Beale Ruffyn C. in Monasterio Wony (Peyton, p. 253B). As no other mention occurs, this may refer to Ballyvorneene C. in Clanwilliam [*q. v.*, section 68].

86. TOUGH, TEAURAGH, TOWER HILL (15). Not marked. It appears in many curious forms in Tudor documents—Zoghesgren, Xoghtesgrene, Johenishesgrene, attempts to transliterate "Tuath Aesgreine."² 1544 The Manor C. or fort of Toghexgrene was recovered from a gang of robbers, called the "Oolde children," in Ogonagh, and granted to Thady Mac Brian and his heirs of Grenegounaghe (Fi., 153, Pat. R., 59). 1587 Teige O'Brien held Tooghesgrey. 1591 Morhirtagh, dominus de Patria Twahaosagrene, obiit (Inq. Exch., 5). 1606

¹ As suggested by Mr. M. J. M'Enery.

² 1539 An indenture between the king and Chonnour O'Brien, of Touyesgren, chief of his nation, as to dues to be paid, viz. : 12 pence for every carwe of land (Carew, i., p. 151).

Livery of Manor of Tuoghesigreene to Murtagh, son of Tirlagh Mac Ibrien Arra¹ (Pat. R.). 1653 W. Collins allowed £3 4s. 2d. for repair of Tough Garrison (Acct. R., 14). 1655 Teauragh, Tough, and Tometerriff shown with two towers (D.S.A., 30). Tough and Pallisbeg C. in repair, bawen, orchards, and two mill seats on the river Glydagh held by Teige O'Brien (C.S., xxx., p. 8, B.D., p. 115). 1666 Roger, Earl of Orrery, confirmed in Manor of Twagh, with Tometariff and Tearaffe or Teauragh (Act Sett.). It was in later days the residence of the Lloyd family.

COONAGH.

The ancient tribe of Ui Cuanach gave their name to the district which appears under their name in our earliest records. The Hui Cuanach were visited by St. Patrick, about 437, according to the Tripartite Life. The district plays no prominent part in the Danish wars or in the history of the Norman settlement. It was in later times in the almost exclusive possession of a branch of the O'Briens. The present barony includes much of the more historic Aes Grian with its interesting centre, Pallas. Esgrene was during the thirteenth and fourteenth centuries an important Norman manor, usually held with the manors of Adare and Croom. It was owned successively by the de Clares, de Cogans, and the Earls of Kildare.

87. COONAGH. Site unknown,² possibly Cullen or Castletown. Sweetman, without any known authority, identifies Oconagh as Old Connaught, near Bray, in County Wicklow. In 1215 King John granted to Henry de Londres, Archbishop of Dublin, the cantred of O'Conath with the vill of Tibrary. 1227 circa, W. de Mariscis held it, in right of his wife Matilda, to whom it had been granted before her marriage by the Archbishop. In 1236 de Mariscis killed Henry Clement, and the Crown seized his lands; but finding in 1245 that Okonach could not be taken, being Matilda's portion, they gave her seizin. In 1250 The chapters of Holy Trinity and St. Patrick's, Dublin, prayed to be indemnified about the grant; but the King, "knowing that the lands and Castle were wrongly alienated," retained them, granting instead 30 librates, and Baliscadan instead of the cantred and C. granted by King John. 1260 Granted

¹ Tirlagh was created a baronet, xxi Jas. I., Pat. R., xxiii., 1623.

² It has been suggested that it is Carriguonagh; but in frequent mention of that place there is no mention of a C. known to me.

by Prince Edward to Simon le Minur. 1290 The Bishop of Emlý surrendered it and the King granted it, Tipperary, Kilfeacle, and Estremoy, to Otho de Grandison. The latter granted it to his nephew Peter de Wypeyns, in failure to his nephew Gerarde de Crous. Peter is called de Estane in other deeds, with reversion to Jo de Estane, called Russelet. 1299 Grant of weekly market and free warren at Oconagh or Actonagh, with Estremoy and Honey to de Grandison. 1278 Edward I. learned that the tower and house of the C. of Oconagh wanted roofing, and commanded Rob. de Ufford to deliver to the constable out of the King's mines enough for the repairs.¹ In 1284 the rent was 9 marks and 8 shillings. C.S.P.I., vol. i., 621, 2805, 3053, 3108; vol. ii., 1516, and p. 549.

CASTLETOWN.

88. CASTLETOWN-COONAGH (25). Marked in Coolbaun. 1578 Moriortagh O'Brien held the C. and orchard in Conagh, namely, Ballycaslane or Castletown (Inq. Exch., 7). 1572 Tirrelagh, his son, died seized of the C.s of Castletown, &c. (Inq. Exch., 7, 10). 1604 Livery granted to his son Murtagh mac Brien Ogonagh of Castletown C. (Pat. R.). 1611 Conoghor O'Brien held Cuonagh C. (Inq. Chan., 8B). 1625 Pardon to W. Longe, Tho. Lahiff, and various Bourkes, for alienations of Castletown. (Pat. R.). 1651-54 A Cromwellian garrison was kept at Castletown and Tough C.s. Cornet J. Andrews paid £18 for hay for the horses at both C.s. (Acct. R., m. 8). 1655 The C. and mill in repair held by Mort. MacBryne (C.S., xxiii., p. 28; B.D., 45).

Fabric.—A tower, 80 feet high, measuring 19 feet by 10½ feet outside, the walls 8 feet 4 inches thick, the western having fallen. The main wing is 13½ feet long inside, with a spiral stair to the top, and an outer round-headed door (O.S.L., 9., p. 431).

OOLA.

89. POLLARDSTOWN OR MOANAHILA (25). Not marked. 1857 Moriortagh O'Brien held Cloghfollard C. (Inq. Exch. 7, 10). 1583 Cloghplallordy or Cloghenflordy C. held by Kynedy and Conor MacBrien (Des. R., 74). 1610 T. Pollard of Brampton, Devon, a

¹ Vol. iii., 646. The silver mines in Coonagh in 1612 yielded 3 lb. silver per ton, worth 5s. 2d. an ounce; lead £11 to £12 the ton. The Crown had ⅓ of silver, ⅓ of lead (Ir. Arch. Soc., i., p. 6).

tailor, enfeoffed James, Baron of Dunboyne, in Cloghpollardy, alias Pollardestowne (Inq. Chan., 9, 20). 1640 The latter held C. in fee (Inq. Chan., 178). 1655 Pollardstown, broken C., James Butler; the townland meared on the north with Longford and corresponds to Moanahila. (C.S., xxiii., p. 3). His widow Mary held it (B.D., p. 35). 1668 Pollardstown confirmed to J. Harding and T. Henry (Act Sett.).

90. CLOUGHDALTON OR CASTLE LLOYD (24). Not marked. Cloughdalon Rock is in Castle Lloyd, and the townland adjoins last. 1578 Tirlagh mac Brien held Cloghdallatowne, "one C." (Inq. Exch. 7, 10). 1583-1586 Conor mac Brien, Coonagh, held Cloghtallon, C. (Des. R., 74; Peyton, p. 24). 1655 Clogdalon held by Connor mac Brien (C.S., xxiii., p. 3; B.D., p. 36; Petty, 67). 1668 Granted to Harding and Henry (Act Sett.). 1688 Coldalon in Ulloe (Trustees' Map, 24).

91. LONGFORD (25). Marked. 1572 Tirrelagh O'Brien held Longhurt C. (Inq. Exch., 7, 10). 1621 Moriort Mac Brien of Castletown held Longortt (Inq. Chan., 25B). 1625 Pardon for alienation of C.s of Longgort and Williamstown (Pat. R.). 1655 Longford C. held by Mortagh Mac Bryne and Jas. Butler (C.S., xxiii., p. 3). 1668 Confirmed to Duke of York. 1688 Confiscated (Trustees' Map, 24). 1703 Sold to John White, of Cappagh, County Tipperary.

Fabric.—A fragment 20 feet high (O.S.L., 9, 428), fairly well preserved.

92. OOLA OR SHANACLOGH (25). Marked. 1282 Wclese (Ullish) granted by citizens of Limerick to J. fitzThomas (C.S.P.I., p. 429). 1285-7 Uladh or Uibhla named in some copies of "Wars of Torlough," as on line of Torlough O'Brien's raid. 1306 Wlys (Oolys). 1542 Owleys. 1544 See under Tough (87, *supra*) for the "Oolde children" robbers. The name is Ullay, Ullish, Oolde, and Oola, from its orchards. 1551, &c. In 1572 Tirrelagh mac Brien held one castle at Knockowlow (Inq. Exch. 7, 10), of which the C. townland, "Oola Hills," is a translation. 1586 Knockowleye, held by Knonogher ohowan mac Brian Ogonanoght (Peyton, p. 247). 1655 See Parish maps (C.S., xxiii., pp. 3-11, and Petty, 67).

Fabric.—A shapely tower, with four gables and lofty chimneys, battlements, and projecting bartizans. The larger windows have mullions, and it is probably little, if at all, older than 1500. It is about 60 feet high and 20 feet square in under room (O.S.L., p. 428).

93. ARRYBREGA (33). Not marked. It adjoins Ballyneety. 1578 Tirrelagh O'Brien of Castletown held one C. at Marevrege

(Inq. Exch., 7, 10). 1586 Conogher McBryan Ogonacht held Uryverygy or Arybregy (Peyton, 248; Des. R., 74).

TOUGHCLUGGIN.

94. SHANDANGAN (24). Not marked. 1655 Sandangyn forms one of a group of townlands in which a C. is shown in Petty's Map (C.S., xiii., p. 9; B.D., p. 38; Petty, 67; D.S.B., 15), granted to A. Brandon. 1688 Confiscated, Shandangine in Cloghine (Trustees' Maps 5, 33). 1703 Purchased by J. White.

95. CASTLECLUGGIN (24). Site marked. 1302 Tohteloggin. 1655 Cloggin marked, but no C. shown (Petty, 67). It may, perhaps, be Ballyvalode, as the townlands adjoin [see next section, but seems to be a very uncertain site].

DOON.¹

96. BALLYVALODE (24). Not marked. 1578 Tirrelagh mac Brien holds one C. in Ballyvylode (Inq. Exch., 7, 10). 1586 Ballyvylode held by Knogher ohowan mac Bryan (Peyton, p. 247). 1655 Held by Therlagh mac Bryne (C.S., xxiii., p. 4), granted to Duke of York. 1688 Ballyvelode confiscated (Trustees Maps, 4A, 24, 33). 1703 Purchased by Hollow Blades Company.

97. CASTLEGARDE (15). Marked. 1586 Castlegarde C. in Cuonagh (C.S.P.L., p. 311). 1587 Called Castlenegarde (Fi. 5282). 1655 Castletown and Killanegard, in Doone, held by H. Earl of Bath (C.S., xxiii., p. 26); Castleanegard (B.D., p. 45); Kasslanegard in Doone (Petty, 67).

98. DROMLARA (24). Not marked. 1606 Morris Hurley of Knoeklong held C. of Dromlara *with* the C. of Kyleduffe (Inq. Chan., 29). Described as C. of Dromlare *or* Kilduff (*ib.* 189). See Kilduff [*infra*, section 99].

Fabric.—It is incorporated in the modern house.

BALLYNACLOUGH.

99. KILDUFF (24). Marked. 1583 Moriart Mergagh when slain in the rebellion of Gerald, Earl of Desmond, held Kyllduff C. (Des. R., 74).

¹ The ancient "Dún Blése" (*ante* 580). "Blése, the name of a swineherd to the King of Hui Cuanach, is he who dwelt in that fort at first." Calendar of Oenghus, Jan. 3. It is called Downnegonagh, or Downleisky in 1624 (Inq. Chan., 3, 68).

Peyton, 241*b*, in Kylduff Parish in the Toghe of Asgrenan). 1617 Maur. Hurley of Knocklong C. held Dromlare or Kilduff (Inq. Chan., 189). 1655 C. in repair, with a mill held by Sir Maur. Hurley (B.D., 49; U.S., xxiii., p. 36); confirmed to Edm. Harrison, and in 1667 to Erasmus Smith's trustees (Act Sett.).

Fabric.—A late peel house, near New Pallas. The east and north sides are down. It is 37 feet long to west, 47 to south; walls 6½ feet thick. It has four stories, and a lofty gable and chimney (O.S.L., 9, 426).

GREAN.

100. PÁLLAS GREAN (24). Site marked. Grian was a place of note in early historic times, having even then a legendary fame going back to the semi-historic or mythical periods. Legends remain of the princess Grian, now recognized as a banshee, and of the early Prince Oilíoll Olum, of the battle fought by the High King, Cormac mac Airt, in 241, and of St. Patrick's visit to Grian in Aradha, *circa* 437. The place was also named in early times "Cnoc na geuradh," or "Champion's Hill." It appears in the Annals, 918. In Norman times, 1216, it was formed into a manor and granted to the Bishop of Emly. 1233 Granted to Maurice Fitz Gerald, and a fair was established the following year. A large mass of material may be found in the C.S.P.I. (1233-1307), Plea Rolls, &c. It was wasted by Turlough O'Brien, 1285-7—"Blue-streamed Grian" (Wars of Torlough)—and forms one of the group of manors with Adare, Croom, and Wrgidy, held in varying amounts by Fitz Gerald, de Clare, de Valence, de Cogan, and the Earls of Kildare. In 1334 a grant was made for the repairs of the C.s. in Estgrene. In later days, 1544, Grencogoanagh was held by Thady mac Brien (Pat. R.), and in 1586 Toghe Asgrenan was in the patria of O'Brien-Arrey, including Kilduff (Peyton, 241*b*). 1611 Sir Ed. Fisher was granted part of the ruinous C. of Pallace, the estate of Tirlagh mac Morough Brien (Pat. R.). 1629 Conor Mac Murtagh Mac Brien held two parts in the C. of Pallesgreny (Inq. Chan., 9, 76). 1655 C. shown near Pallice which was held by Murragh oge Mac Bryne and Sir Morris Hurley (B.D., 50; Petty, 67). It seems to have been demolished before 1680, as Dyneley notes that there was anciently a Castle on a neat mound at Pallice" (R.S.A.I. iii., p. 283).

Fabric.—The site was unknown to the O.S.L. (8, p. 111) in 1810, it is given on the maps; the mote lay about 40 yards to the east of the foundations; there had been traces of strong walls there in 1800.

101. BALLYTRASNA (24). Marked. 1185 Balitarsini was granted to the monks of St. Mary de Magio by Prince John (C.S.P.I., 136). 1251 Rob., Bishop of Limerick, made an agreement before Robert de Chardclawe, at Waterford, about land in Clonbalitarsene (B.B.L., p. 8). 1298 Suit of Jo f Pagan de Interberg and Rob. Dunmyng as to a claim of dower by Agnes Blound off Balitarsne (Plea R., 36 & 40, of xxvi Ed. I.). In 1577 Pardon granted to Morogho buy O'Kee of Ballitarsne, and 1582 to Teige O'Hanan of same (Fi. 3149-3820). 1586 One of the chief C.s in Cuonogh (C.S.P.I., p. 236). 1600 Carew marched against a C. of Morough Kewghe (MacBrian) at Ballitarsny to open the road from Limerick to Cashel, but the garrison fled on his approach (Fac. Hib. i., p. 85). 1624 Teige mac Murrogh mac Brien held the C. and mill (Inq. Chan., 9, 50). 1655 held by Murrogh mac Brien, junior (B.D., p. 48). 1667 Dyneley notes the monument of the Mac Brians of Ballytarsney, in Grean Church (R.S.A.I., viii., p. 283).

Fabric.—The foundations, 55 feet by 24 feet over all, were attributed to the O'Briens in 1840.

102. NICKER OR CONIGER (24). Marked. A very doubtful site; foundations said to be a C. in 1840, but without any support from the maps, Surveys, or Records, so full in other cases.¹

TEMPLEBREDON.

103. BALLYNEETY (33). Marked. It is stated in the pedigree in Ulster's Office, that the Whites came to Ballyneety from England, and built the C. there in 1418. This may be mythical, as the family name occurs from before 1200 in the city, and soon afterwards in various parts of the county. 1578 One C. at Whytstown in Coonagh, held by Tirrelagh O'Brien (Inq. Exch., 7, 10). 1583 Kynedy mac Bryan of Ballinitye and Conoghor mac Bryan of Cwonaghe held C. of Ballanity in Templebredon (Des. R., 74). 1586 Kuonogher mac Bryan Ogononaght owned Ballynity, in Grean Ogonacht (Peyton, 247). 1587 The C. of Balleneightie, otherwise Whytes Town, late of Kennedie mac Brien, granted to Edward Fytton (Carew, p. 447). 1621 Moriort mac Brian held Whitestown C. at his death (Inq. Chan., 25B). 1655 Ballin Itie and Cloghnician, held by Mort. Mac Brien and Meiler Mac Grath (C.S., xxiii., pp. 11, 13, and

¹ Mr. Grene Barry thinks it is a caher site only, and that the surveyors called it a castle without authority.

Petty, 67). 1690 Sarsfield surprised and blew up the artillery of William III., when on its way to the siege of Limerick. The C. was then a ruin. 1703 Edw. Cosgrave, of Dublin, bought Ballyncety, the estate of Ed. Rice.

Fabric.—There are only slight traces of the foundations on the north side of the rock which, since 1840, has been named Sarsfield's Rock.¹

CULLEN IN COUNTY TIPPERARY.

104. CULLEN, in Coonagh (58 Tipperary). Marked. It is called "Cuillenn ua cuanach to the westward, where, at Finn's hands, Cuillenn mac Morna perished," in the "Colloquy of the Ancients," in the Book of Lismore (*Silva Gadelica* ii., p. 118). In 902 Cuilleán is given with Asal, Eibhleó, Cua, and Claire² as a residence of the King of Cashel (Book of Rights, p. 93). It formed part of County Limerick, till late in the seventeenth century, and is less than half a mile from its border. 1199 Cullene, a knight's fee in Huhene, granted by Lambekin fitzWilliam (C.S.P.I., No. 96). 1258 Ric. f. William appointed as his bailiffs Ric. and W. fitzGriffin to give seisin of Cullyn to Rob., Bishop of Limerick (B.B.L., pp. 34-93). 1540 Cullein. 1583 A small, low, broken C., Cullenoghwonagh, lying near the County Tipperary (Des. R., 8). 1586 Cullenoughwonagh, or Cullenagh in Coonagh, estate of late Earl of Desmond (Inq. Exch.), granted to Sir E. Fyton (Fi. 5032), described as "the broken C." of Collenoghwonagh (Carew, 1537, p. 447). 1607 The C. granted to D., Earl of Thomond (Pat. R.). 1608 Confirmed with Castle quarter and other portions (*Ib.*). 1655 Cullinagh, in Towgh Parish, held by Mahon mac Kennedie (MacBrien), and shown as in County Limerick (C.S., xxx., p. 12; Petty, 67).

KILCORNAN IN COUNTY TIPPERARY.

105. CASTLE LOAGHNY, now in Tipperary (58). Site marked in Longstone. The mearings are given in Trustees' maps, 1688 (Nos. 29 and 31); Castleloghna, then in Templebreedon. 1655 Kilcornane parish, given as in County Limerick; Cloghniean, held by M. MacGrath (C.S., xxii., p. 12).

¹ There is a view in Dr. Joyce's "Child's History of Ireland."

² Tory Hill, Slievefelim, and Dunclare.

ADDENDA.

3 and 21. We should perhaps have noted the admission of English to the tower of John's Gate by Captain Fennell. 5 decided the surrender of the city to Ireton. Also that the first attack on the outworks of Limerick by the latter was on a fort at the Salt Weir.

65. Sir E. Fisher in 1611 was granted the C. and town of Ballyvarnyne (Pat. R.).

VI.

CRAIGYWARREN CRANNOG.

EXCAVATED BY W. J. KNOWLES AND GEORGE COFFEY.

REPORT BY GEORGE COFFEY.

[PLATES V-X.]

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THE crannog of Craigyarren is situated at the southern end of the bog of that name, four miles to the north-north-east of Ballymena, Co. Antrim. Towards the north, the bog extends into the townland of Lisnacrogger. On the boundary, at a point where the townland of Carneogagh meets the townlands of Craigyarren and Lisnacrogger, remains can still be traced of the crannog of Lisnacrogger, notable for the objects of La Tène style found there.¹ This latter crannog is about half a mile distant from that of Craigyarren, and the sites can be seen from each other.

Craigyarren crannog has been known for some time. It is included in Col. Wood-Martin's list for the Co. Antrim. He figures a bronze pin of the hand-type, decorated with derived Late Celtic pattern, found near this crannog.² Some years ago a canoe was found in the bog, which was secured by a farmer named Thomas Crawford, but no excavations were made on the site previous to the present.

The crannog lies about eighty yards out from what appears to have been the western shore of the original lake, before the bog filled it up. From the lie of the land and bog, it is evident that the crannog has been covered by a considerable depth of peat, probably not less than 6 feet. This has all been cut away down to the surface of the crannog. An old inhabitant informed us that this had

¹ In the published accounts of this crannog, the name is given as Lisnacroggera. There is no authority for the final 'a.' The people of the locality call the townland Lisnacrogger, and it is so spelt on the Ordnance Maps.

² "Lake Dwellings of Ireland," p. 110.

been done a long time ago, and that the present surface had not been disturbed in his recollection for thirty years. When visited, for a preliminary inspection of the site, the stakes of the crannog could be seen sticking up through the surface of the ground, and the circle of the site could be traced by following the outer stakes. A deep drain had lately been cut by the tenant of the farm through the centre of the crannog, exposing the horizontal timbers. Nothing of note appears to have been found when cutting the drain. The upper stone of a quern was found about that time somewhere on the crannog, and is now in possession of the tenant of the farm. It is of the usual form, without special features.

Permission to excavate the site having been obtained from the landlord, Sir Hugh Adair, and an agreement made with the tenant, an application was made to the Academy for a grant in aid of the work. The Academy at once acceded to our request on the understanding that the finds should be placed in the Academy's collection in the National Museum.

Excavations were begun on the 28th August, 1901, and carried on continuously, Sundays excepted, to the 10th September. We were assisted by Mrs. Knowles, Miss Knowles, and Miss M. Knowles, the late Rev. G. R. Buick, LL.D., M.R.I.A., and Dr. D'Evelyn, of Ballymena. To their skilled assistance not a little of our success is due. Four labourers were employed.

Digging was first started on the south side about 15 feet outside the crannog. A wide trench was pushed in until the outer line of stakes was reached at A on plan. The stakes were then followed up for about one-fourth of the circumference of the crannog on the east side. The surface of the crannog was then laid bare over the south-eastern quadrant. Digging was then resumed at the south side, to the west of the drain, and followed round and inwards, until about one third of the whole area of the site was uncovered. Nothing was found outside the crannog at the south side. Digging was then commenced at the north side. A trench was dug well out from the piles, from east to west, and worked in sideways till the piles were reached. Here the kitchen-midden was found. The digging was then carried across the crannog, and practically the whole site uncovered.

The construction of the crannog may now be described. The bottom on which the structure is built consists of a black tenacious mud, greasy in feel. This was reached from 2 to 3 feet below the surface of the site, and rendered digging to any great depth impossible, water coming in at about 5 feet down. This mud was

probed round the margin of the site to depths of 6 to 8 feet without finding bottom.

The plan of the crannog is approximately circular—62 feet by 52 feet (see plan, Plate VI.). A layer of heather and small branches was first laid down. On this were laid tree trunks and heavy branches, chiefly ash, hazel, birch, and staked down with oak and ash piles. Round the edge of the structure the branches (chiefly birch and hazel) were laid lengthwise, with evidence of care, and piles driven in on the outside in a fairly regular manner, also here and there through the branches, so as to prevent them from spreading outwards (see plan). The piles are of oak and ash. The oak piles, in nearly all cases, were square or rectangular in section; the ash, round. They were pointed with clean cuts, evidently by an iron tool.

Over the horizontal timbers a layer of heather was laid, making a clean, even surface (see section, Plate VI.). At the north side the foundation was consolidated with large quantities of stones, and here timbers and piles were less numerous. Throughout the crannog boards, or small adze-planed planks of oak, were constantly turned up. They ran from 3 to 5 feet in length, by 6 to 10 inches wide, by 1 to 2 inches thick. In a few instances they reached 6 or 7 feet in length. Whatever structures were left above ground when the crannog was originally destroyed or abandoned, must have been levelled, and their planks scattered when the peat was cut down to the floor-surface. It is possible, therefore, that some of these boards are the scattered remains of structures, but from the fact that they were often found below one or two layers of foundation timbers, it was apparent that they were, for the most part, used to strengthen weak places in the foundation. We did not, however, find any examples of planks laid down as footings for stakes (the stake fixed in a mortised hole in the plank) as in the case of the crannog at Moylurg, excavated by the Rev. Dr. Buick ("Journ. R.S.A.I.," vol. xxiv., p. 316, 1894).

At B on plan a large board was found, 6 feet 10 inches long by $10\frac{1}{2}$ inches wide, and from 2 to $2\frac{1}{2}$ inches thick (Plate VII., fig. 1). At each end there appear to have been large mortised holes to carry stout posts, and between these are six smaller holes. At C was found the largest board on the site, measuring 7 feet $9\frac{1}{2}$ inches by 1 foot 3 inches by from 3 to 4 inches thick. Three square mortised holes are cut in it, and near one of the end large holes are two small holes, one of which is divided by a septum on one face, so that on one side of the board it appears as a single hole, but on the other as a double hole (Plate VII., fig. 2).

In addition to these planks, a broken piece (2 feet) of a thick plank or a framing beam, with large rectangular mortise holes, had been thrown out, probably when digging the drain, and lay exposed on the crannog (Plate VII., fig. 3). It measured $7\frac{3}{4}$ inches wide and $2\frac{3}{4}$ inches thick. The mortised holes were about $7\frac{3}{4}$ inches by 3 inches.

The scattered remains of a hut were found at the north-east of the site (D on plan) adjoining the kitchen-midden; and a few yards to west, a hearth, the stones of which were still in place (E on plan). The hut, judging from the boards as they lay, appeared to have been square in plan, and about 8 feet by 8 feet. A few of the boards found at the hut-site were pierced with many small holes in some of which the fragments of the wooden pegs which had held them in place still remained. The pegs were about 1 inch in diameter, and had rounded heads. Two of the boards are figured (Plate VII., figs. 4 and 5). It is difficult to understand why so many pegs were wanted to fix these boards, or what exactly was their purpose. This remark also applies to a board found at the west side (F on plan).

Two shaped pieces of oak were also found at the hut (Plate VII., figs. 6 and 7), the purpose of which is not quite clear. Fig. 6 may have been a footing-piece. The most advanced piece of carpentry work is shown in Plate VII., fig. 8, and was probably one of the corner posts of the hut. The large plank forming the footing was 8 feet 3 inches by 1 foot, and about 2 inches thick; the upright was imperfect at the upper end; the lower portion, which was shaped like a stake, and passed through a mortise-hole in the first plank, was 3 feet in length, and was, no doubt, staked down into the floor of the crannog to that extent.

The hearth consisted of a single flat stone, 1 foot in diameter, surrounded by smaller stones, as shown on plan. A large quantity of white ashes covered and underlay the stones.

FINDS.

WOOD.—In addition to the pieces of shaped wood mentioned in the general description of the crannog, a few objects of wood were found.

Plate VII., fig. 9.—A thin circular disc of oak, with a hole in the centre, 4 inches in diameter, and $\frac{1}{2}$ thick. It is like the bottom of a

small wooden pail, but the hole at the centre ($\frac{3}{8}$) shows that its use was different.

A thick circular piece, with a hole in the centre. It is now greatly shrunk, but was circular when found, $3\frac{3}{4}$ inches in diameter, and 1 inch thick, size of hole $\frac{3}{4}$ inch diameter.

A wooden collar-piece of oak (Plate VII., fig. 10), outer diameter 6 inches, inner diameter $3\frac{1}{8}$ inches.

The fragments of a long shaft, or handle, 23 inches by 1 inch in diameter. The end was reduced, and bore a leather collar or washer.

FLINT.—Chips, flakes, and worked pieces of flint were found in considerable numbers throughout the crannog. In all, fifty flakes and worked pieces were collected; but many chips and worthless fragments were passed over. They include three scrapers, a well-formed concave scraper or saw, a fragment of another, a large, flat, rude piece with a concave scraping edge at one side, a kite-shaped arrow-head, and several flakes showing secondary work and battering in places.

The largest of the scrapers was found in the south-eastern quadrant. The three polishing stones mentioned in the next section were found at intervals within a range of a few yards from this scraper. The concave scraper was found at the hearth-site; it has not suffered from fire. The arrow-head lay immediately on the plank B. Here the ground had been disturbed by tillage, which came up to the margin of the site at this side. No cores were found, nor any evidence, in the shape of an accumulation of flakes, that the flint had been worked on the crannog. Antrim is the chief flint county of Ireland. In the fields round Ballymena, broken flints and flakes may be picked up anywhere, and worked flints, especially scrapers, are numerous. It is possible that the scrapers found in the crannog were used by its inhabitants, and the pieces with battered edges suggest that these latter may have been used for striking fire; but the small number of characteristic scrapers which were found (3), and absence of hammer-stones (only one good example was found) and other stone implements, indicate that the examples found cannot be regarded as a survival of the Stone Age. Some, if not all, may have been brought into the crannog with the clay and stones used for flooring the site. It has been desirable to go into this question in a little detail, as the presence of worked flints and stone implements in crannogs has been sometimes advanced as evidence of the antiquity of such crannogs, or as an argument against the antiquity of stone

implements. In the case of Craigywarren, the evidence does not point to either of these conclusions.

STONE.—(a) Three polishing stones, found as mentioned in previous section; they are slender pebbles $3\frac{7}{8}$ to 5 inches in length. One of them has been rubbed down a good deal at the ends (Plate VIII., fig. 1). Another is slightly abraded at the ends by hammering, and is rubbed down in places along one side. The third has been slightly rubbed down at the ends. They also show the polish of rubbing on the surfaces.

(b) A small polishing stone of the same class rubbed on one surface.

(c) A good hammer-stone, and a quartzite pebble; the latter shows some slight battering, in a diagonal direction, on the faces, after the manner of some "tracked stones." Some other smooth pebbles and fragments were found, which may have been used as polishing-stones.

(d) A quartzite pebble, with diagonal battering on both of the flatter surfaces. Tracked stones frequently show irregular battering, more or less parallel to the line of the track. This stone has been used in the same way, but no definite track has been made.

(e) Four pieces of fine pink sandstone, sharpening or polishing-stones. The largest ($2\frac{1}{8}$ inches) is remarkable for a rude sketch of trumpet ornament engraved on one surface (Plate VIII., fig. 2); the other surface has been used as a hone, and is worn hollow. Another piece is worn into hollows all round the margin, evidently from rubbing or burnishing-down some object of round section. These pieces were found in the kitchen-midden.

(f) A fragment (about a quarter) of a large stone celt. On one surface it is much pitted from being used as an anvil-stone, and to this use may be attributed its fracture. This specimen is interesting, as showing how stone implements have been brought into crannogs and put to secondary uses.

(g) A small spindle-whorl, $1\frac{3}{8}$ inch (Plate VIII., fig. 3).

(h) A rough piece of stone artificially bored; a weight or sinker.

(i) Two stone discs and a fragment of a third (Plate VIII., fig. 4) about 3 inches in diameter.

BRONZE.—A few ornaments of bronze were found, consisting of the following:—A ring brooch, $3\frac{1}{2}$ inches in length of pin, and $2\frac{1}{16}$ across circular head (Plate VIII., fig. 5). It is silvered, and is plain, with the exception of the dots shown round the edges of the expanded flat surfaces of the ring; the pin is flat. This class of plain plated

brooch is pretty common, and it can hardly be dated earlier than about 900 A.D. The flat pin of a second brooch was also found. It is very well made, and the raised rims of the eye show more than usual finish. A small disc of bronze, $\frac{1}{2}$ inch in diameter, was no doubt the centre-cut out of the disc of a plain ring-pin. A bronze ring, originally plated with silver, the size of a finger-ring, with cross-hatched pattern on the band (Plate VIII., fig. 6). Lastly, a bronze ring-bracelet, $2\frac{3}{4}$ inches in diameter. It is ornamented with a *guilloche* or interlocking S and dot pattern (Plate VIII., fig. 7). These objects were found about the hut and hearth.

IRON.—The sword (Plate VIII., fig. 8) found below the timbers of the hut. It is in unusually good condition. Length of blade 1 foot 8 inches, of tang $4\frac{1}{8}$ inches. A similar sword was found in Dunshoughlin crannog. The pointed butt-end of a spear, 6 inches long, 1 inch outside, and $\frac{5}{8}$ inch inside diameter of socket (Plate IX., fig. 1), was found in the stuff thrown out near the hut-site. An auger (Plate VIII., fig. 9) was found sticking down in the flooring branches at the centre of the crannog. It is at present 17 inches in length. Two bill-hooks were found at the western edge of the crannog, near the spot marked B on plan. They measure $8\frac{1}{2}$ by 2 inches, and $8\frac{3}{4}$ inches by $1\frac{7}{8}$ inch, respectively. Some of the wood still remains in the sockets (Plate IX., fig. 2). The chisel (Plate IX., fig. 3) was found in the stuff thrown out near the hut-site. It measures 7 inches in length, and is $\frac{3}{8}$ inch in width of blade. It is similar in form to a chisel figured by Sir John Evans among remains of British tools.¹ The small iron pan (Plate IX., fig. 4) is somewhat like a scale-pan; but it has no holes for attachment, nor any indication that it ever had a handle of any sort; diameter $3\frac{5}{8}$ inches, and $\frac{3}{8}$ inch deep. It was found in the kitchen-midden, as was also the uncertain object (Plate IX., fig. 5). This latter consists of a square iron rod of $\frac{1}{4}$ inch diameter, bent twice at right angles in opposite planes, one end of which passes through a square piece of wood, apparently a handle. The measurements are: length of first bend $2\frac{1}{2}$ inches, between bends $10\frac{1}{4}$ inches, second bend $5\frac{3}{8}$ inches, length of wooden piece $3\frac{1}{4}$ inches. The wood has now flattened somewhat from shrinking; it was originally 1 inch square. This object is in some respects not unlike a key, but its use seems uncertain.

¹ "Archæologia," vol. liv., p. 139.

POTTERY.—Few fragments of pottery were found. With the exception of some crucibles, the absence of pottery presented a marked contrast to most other crannogs, especially some of the Fermanagh crannogs, in which pottery was abundant. The half of a straight-sided, flat-bottomed vessel (Plate IX., fig. 6) was found at the hut-site. It measures, height $2\frac{1}{2}$ inches, diameter of mouth 5 inches, and of base $4\frac{5}{8}$ inches. A fragment of a similar vessel, but of slightly rounded side, was found in the same place; also three small pieces of the same class of pottery. Two crucibles were found. The most perfect one (Plate IX., fig. 7) measures $1\frac{1}{2}$ inch high by $1\frac{7}{8}$ inch across mouth. The other one was somewhat larger, $2\frac{1}{8}$ inches high. A quantity of red vitreous matter adhered to the outside, showing the use of red enamel.

LEATHER.—The pieces of leather-work were all found in the mud of the kitchen-midden. With one or two exceptions, they were fragments of shoes. Two were tastefully decorated (Plate IX., figs. 8 and 9). The end of the tongue-piece (Plate IX., fig. 8) is finished with a skilfully-cut-out trumpet ornament, the effect of which is very good, and the whole shoe, of which the upper only remains, $7\frac{1}{2}$ inches long, was evidently very well made. Trumpet pattern was also applied in blind tooling to the tongue and heel of the shoe (Plate IX., fig. 9). The leather of this shoe is much stouter than that of the former. The shoe is nearly complete, $8\frac{3}{4}$ inches long; a large piece of the under leather remains as shown in the figure. It was eased by cuts at the sides of the tongue, and the upper part of the latter, which was no doubt ornamented, has been cut off. The other fragments of shoes found were in bad condition, and had no special features of interest.

A thin leather bag or pocket of leather should be noticed. The leather is very thin and fine, like kid, and in bad condition; a straight binding strip runs along the sides, which are straight, with square angles.

CONCLUSIONS.—The crannog does not appear to have been destroyed by violence, or we may suppose the serviceable things found would have been taken away by the victors—the brooch, the good sword, &c. These also indicate that it was not peaceably abandoned, or they would not have been left behind.

The crucibles, with adhering traces of red vitreous enamel, and the good work of one of the brooch-pins, as also the decorated shoes, point to a richer state of industry and of inhabitants than the scantiness of the remains would at first indicate.

The absence of interlaced ornament and presence of Late Celtic or trumpet ornament would, taken alone, point to an early date; but the brooch (Plate VIII., fig. 5) is not an early type. This form of brooch, with large, flat, expanded ends of ring, resembles the silver brooches found in Ireland, with interlaced ornament of a Scandinavian flavour; and the silvering of the surface was much in vogue in what is called the Danish period. This silvering of bronze, giving it a silver-plated look, is more common than would be supposed at a cursory glance. Many of the buckles and ornaments in the large find of Danish objects found at Kilmainham, near Dublin, are silvered in this way. Silver goes black, and the coating, being very thin, easily wears off; but many plain bronze pins and brooches will be found on close examination to bear traces of having been so treated. It does not, therefore, seem possible to place the brooch and pins before the tenth century. Mr. Knowles is inclined to regard some of the objects as earlier, and as indicating a somewhat long occupation of the site. But there did not seem to be any sufficient difference in levels of the finds to separate them; clear evidence was not therefore to be obtained on this point. In any case, the occupation of the crannog may be placed certainly as late as that century.

ANIMAL REMAINS.—A large number of bones were found in the mud of the kitchen-midden, and a few around the margin of the crannog. They were of the usual species found in crannogs: Deer, Horse, Ox, Sheep, Goat, and Pig. A selection of them has been given to the Natural History Department of the Museum, and may prove of some interest in working out the early fauna of Ireland—a subject on which Dr. Scharff has been engaged for some time. The most important find was, however, three very fine Horse skulls, two in exceptionally good condition. Dr. Scharff regards them as perhaps the finest heads of ancient Horse preserved in any museum. The Museum possessed only a few fragments hitherto; and these skulls more than repay the work of the Academy in excavating this crannog.

Professor Ridgeway, in his recent work, "The Origin and Influence of the Thoroughbred Horse," regards these skulls as of the highest interest, as proving that Horses of the North African type were used in Ireland as early as the tenth century. The importance of these skulls, as well as the rarity of the remains of the ancient Irish Horse in our collections, adds a special interest to the photographs reproduced on Plate X. Dr. Scharff has kindly supplied the

following measurements for comparison ; but it is to be hoped that he will publish a more detailed memoir.

Only the best skull, viz., that of a full-grown stallion, is reproduced on Plate X. The following are the measurements of this and of a mare, which will be of advantage for comparison with those of the horses from La Tène and other localities in continental museums :—

	MALE.	FEMALE.
Length of base of skull from foramen magnum to angle between inner incisors,	442 mm.	464 mm.
Greatest width between the post-orbital processes of the frontal bones,	189 „	185 „
Greatest width between the two glenoid surfaces,	184 „	183 „
Distance between foramen magnum and posterior line of junction of the palatines,	207 „	226 „



FIG. 1.—View looking north.

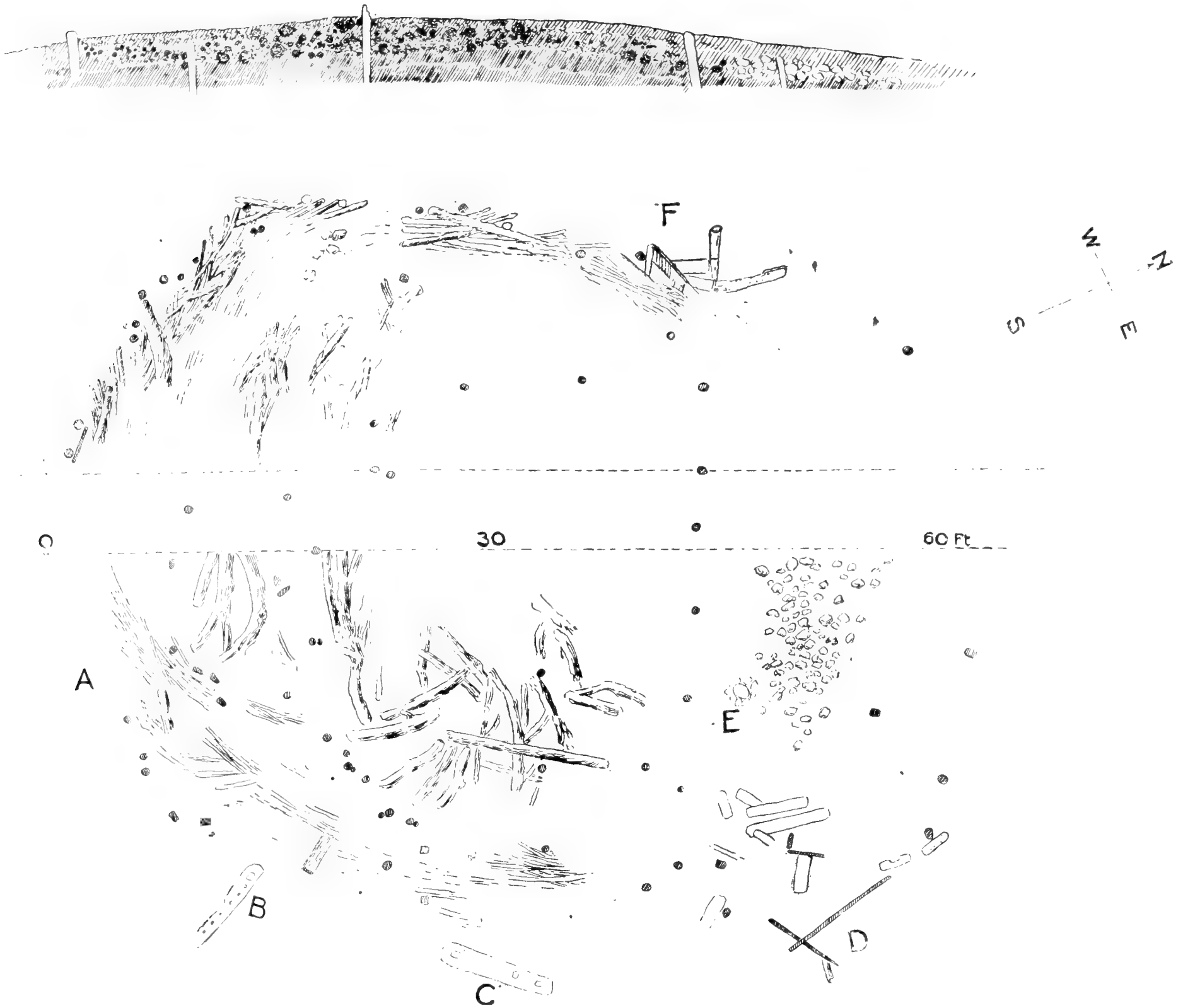


FIG. 2.—View of south-west side.

CRAIGYWARREN CRANNOG.

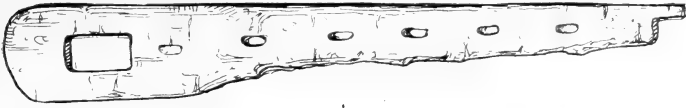
G. Coffey, Photo.





Plan and Section of Craigwarren Crannog.

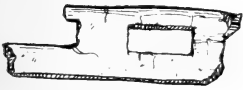




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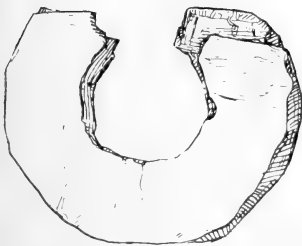
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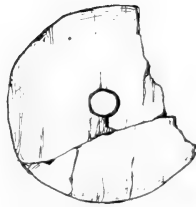
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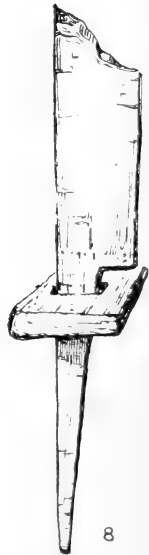
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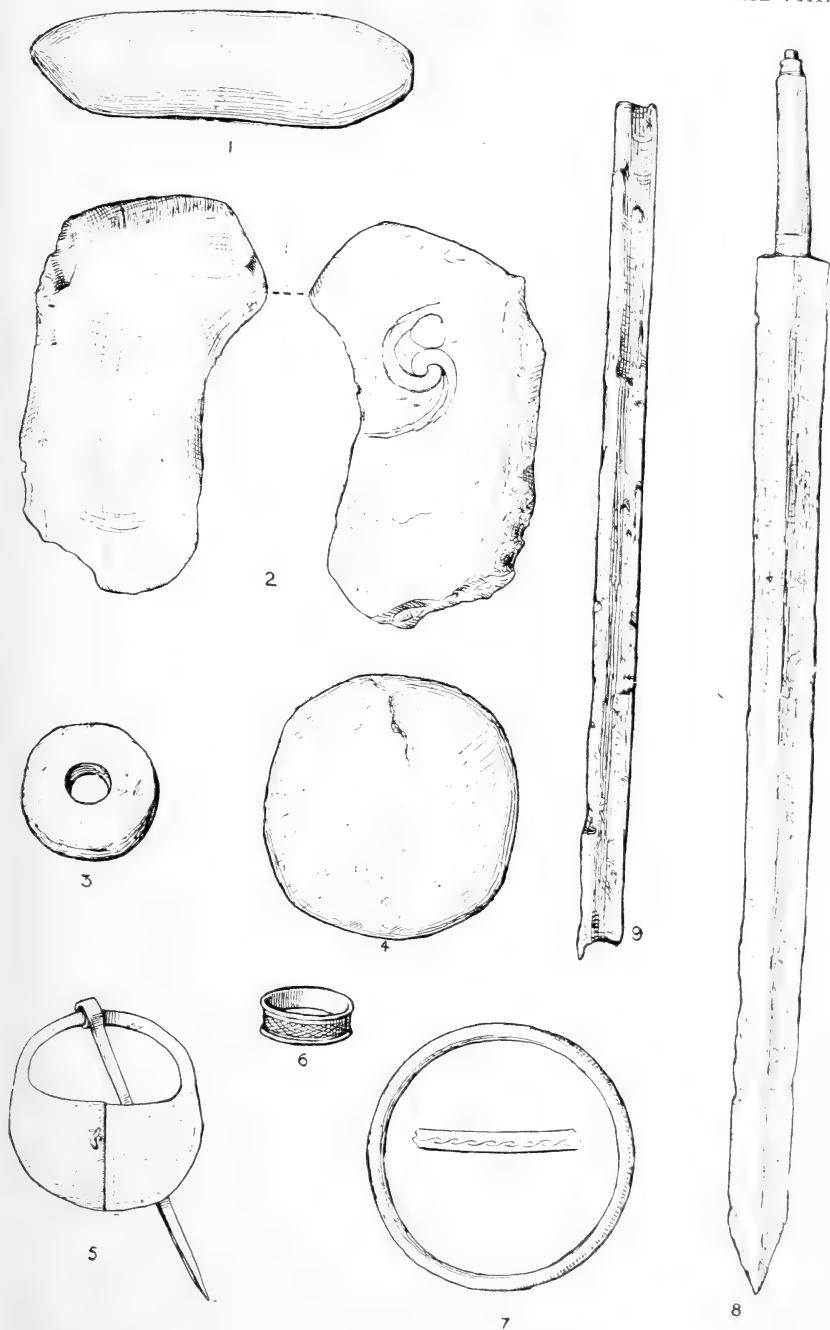
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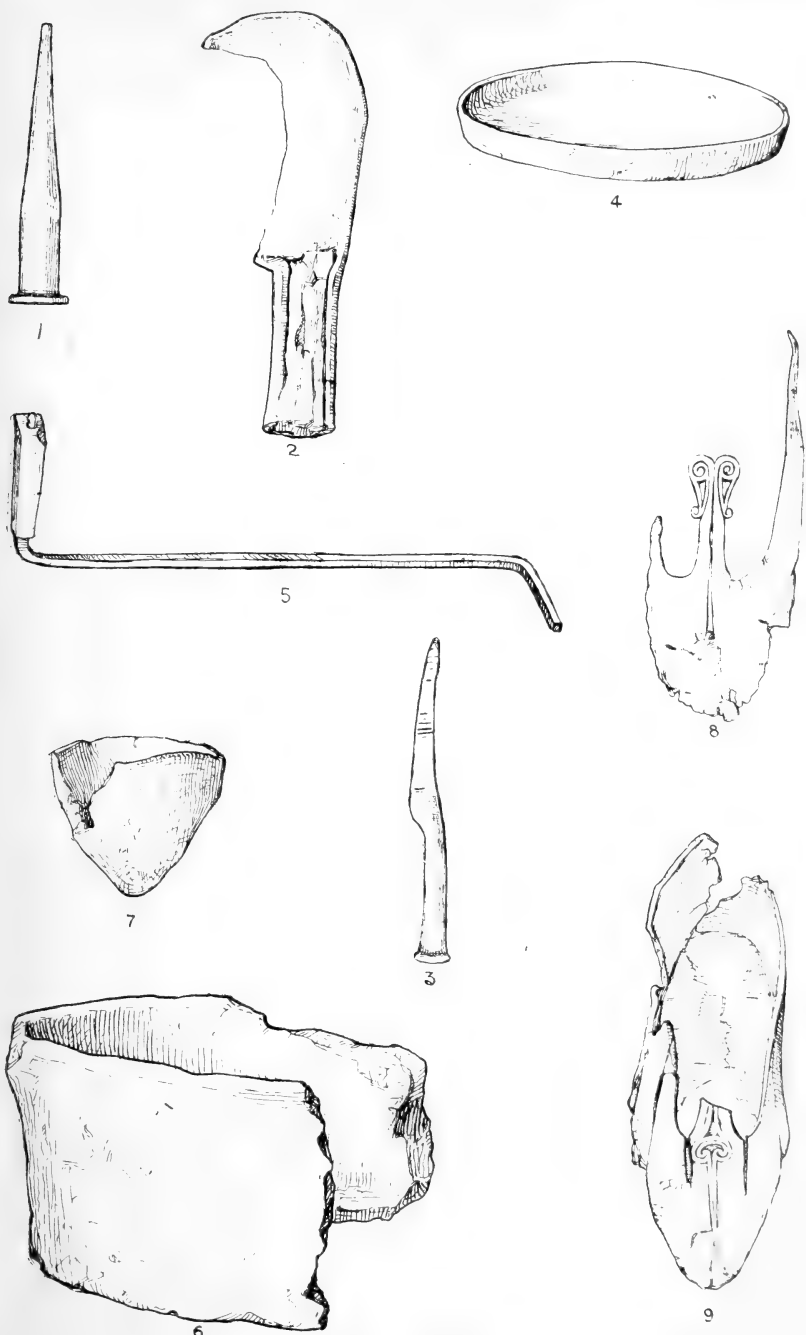
Remains from Craigywarren Crannog.





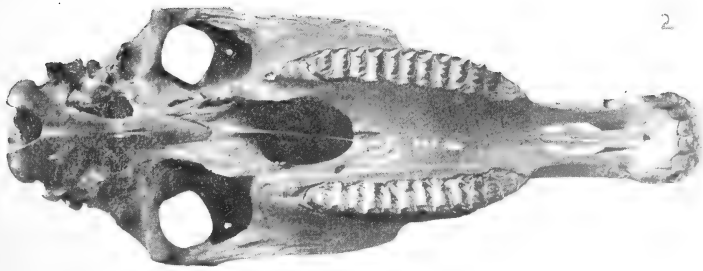
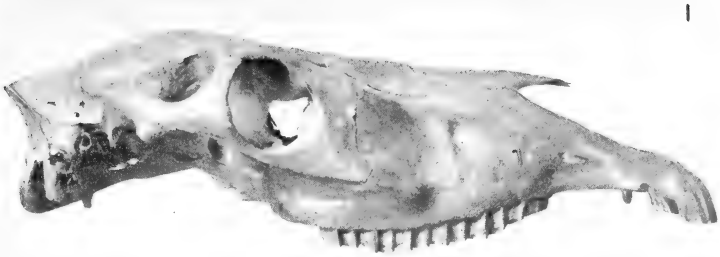
Remains from Craigwarren Crannog.
($\frac{1}{2}$ linear except figs 8, 9.)





Remains from Craigywarren Crannog.





Stallion's Skull from Craigyarren Crannog.



VII.

TWO FINDS OF LATE BRONZE AGE OBJECTS.


BY GEORGE COFFEY.

(PLATES XI.—XII.)

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IN the year 1904 the Academy secured an important find of Late Bronze Age objects. They consist of a socketed celt, a gouge, a pin, a razor (the last in a simple leather case), a portion of a woollen garment, an ornament of horsehair, like a tassel, and some pieces of wood. Miss J. S. O'Connor, of Ballycastle, who took a great interest in the find, was instrumental in enabling the Academy to purchase the objects from the finder.

Unfortunately, Miss O'Connor did not hear of the find until about a fortnight after it took place. In a letter of the 27th June, 1904, she has put in the following connected form such information of the finding as she and her sister were able to get, the leading circumstances of which she had already acquainted the Academy with on first notifying the discovery:—

“These objects were found in a bog in the townland of Cromaghs, parish of Armoy, County Antrim, on Tuesday, 12th May, 1904, when Mr. Robert Black, with an assistant, was cutting turf. He was digging the fourth row from the top, which was only a few inches above the gravel bottom of the bog, when something appeared which seemed at first sight to be a kind of mossy accumulation which sometimes appears in bogs, and which in this district is called ‘Peat Cat’—so it sounds; next they thought it to be a piece of old sack, and the assistant dragged some of it upwards, thus, Mr. Black believes, displacing the position of the objects, which had been most likely wrapped inside the cloth; then, what made him think he had come on something unusual, he saw the ornament, or bow, lying upon the top of the remaining cloth: it was in this form ; but then in using the spade three of the pieces composing it were injured, and the piece

forwarded to the Academy was the only perfect one remaining. Then the spade struck the pin, which was sticking in pieces of the cloth; then the rest of the objects were found all close together. The little leather case (with the object which it enclosed) escaped Mr. Black's attention on that day; but when looking carefully in exactly the same spot on the following Monday, he found it also. We think that, perhaps, if the objects had [not] been wrapped in the cloth, the heavier ones would have sunk in wet weather quite down to the gravel. Mr. Black removed the pieces of cloth to his house, after they had remained on the surface of the bog for some days.

"There were also remains of leather straps, some about one inch and a quarter in width, some narrower, and some round the objects like beads or buttons; but these all crumbled away at once. Mr. Black has since dug back into the bog for some distance—more than five feet backwards—but nothing further has turned up."

Mr. Black called at the Museum last February, but could add nothing to the account given by Miss O'Connor.

The objects may now be described. The socketed celt (Plate XI., fig. 1) is well made, with expanded edge and flat sides, boldly curved, $3\frac{3}{8}$ inches long by $2\frac{3}{4}$ inches across the cutting-edge and 1 inch internal diameter of socket. The gouge (Plate XI., fig. 2) is $2\frac{3}{8}$ inches long by $\frac{3}{4}$ inch across cutting-edge, and $\frac{1}{8}$ inch in diameter of socket. It has some peculiarities: the edge is expanded fan-wise; occasionally an example shows a tendency towards edge-expansion, but it is more decided in this specimen than is usual, forming an ear at each side; then the edge is not on the prolongation of the back line of the socket; it is sloped from the back to the front, making a distinct elbow, as seen in the side view. Thus, it does not require the handle to be so much depressed when using as if this were not so. This feature is not found in any of the other of the numerous examples in the Academy's collection, at least to so marked an extent; and it does not occur in the illustrations of English gouges in Sir John Evans' "Bronze Implements of Great Britain." In Scotland, it may be mentioned, gouges are of extreme rarity.

The pin (Plate XI., fig. 3) is of a form fairly common in Ireland. The disk-shaped head is ornamented with concentric circles surrounding a raised conical centre. The head is bent over, so that the disk is parallel to the pin, as is generally the case with the Irish examples of this class of pin. It is unusually long; they are mostly about 6 or 8 inches. This pin is, however, $12\frac{3}{4}$ inches, including the head.

Plate XI., fig. 4. A thin, double-bladed, tanged knife of the form

generally called a razor, $4\frac{3}{4}$ inches long; these blades usually have a small hole at the top, just below the bifurcation of the blade (in a few specimens it is absent), the use of which is not known, but this example is exceptional in having the hole in the centre between the two raised ribs which divide the blade. What gives, however, a unique interest to this razor is the leather case in which it was found (Plate XI., fig. 5). It consists of a simple fold of leather, with the hair left on and turned inside. There is no trace of stitching along the sides; but, from the way the ends are trimmed to a curve, its purpose as a case was evidently intentional.

The woollen garment (fig. 1) has suffered much, and is now in

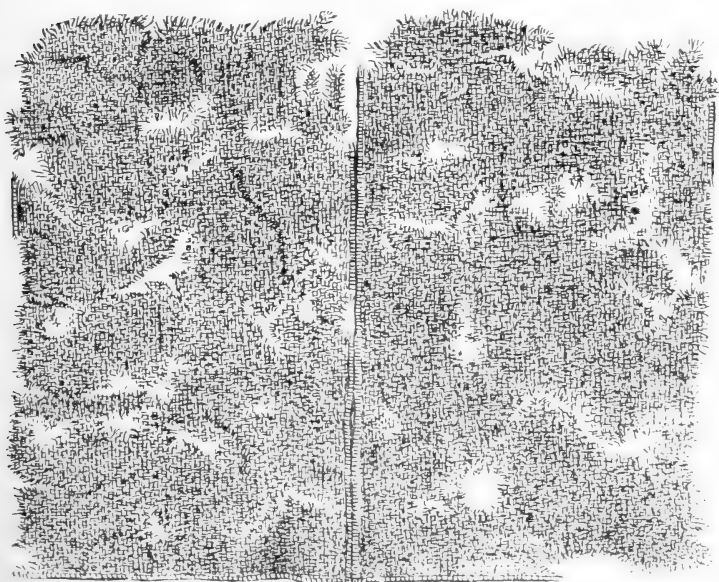


Fig. 1.—GARMENT OF WOOLLEN CLOTH.

fragments. It was left lying on the surface of the bog for some days, and pulled to pieces by the people, who, no doubt, took bits of it away. It is made of two widths of plain, woven cloth. Portions of the finish of the edges remain at both sides, and down the centre where the two pieces were joined; a fragment at the bottom is still so joined, and retains the stitching of woollen thread, but for the greater length of the seam it is separated. The width of the cloth appears to have been $18\frac{1}{2}$ inches. The bottom is completed by a similar edging. How

the upper end was finished, we cannot say; it is not complete, and no fragment that would afford an indication remains. Some small fragments, which do not fit in to the larger piece, seem like a turn over, or thickening piece, but it is quite uncertain. We may, however, conclude that it had no sleeves, as they would have been noticed when found; but Mr. Black consistently speaks of it as simply cloth. A piece is illustrated full size to show the weaving (fig. 2), and a drawing of the garment, as far as it can be put together, is given (fig. 1). It seems probable that this garment consisted merely of a square, or rather

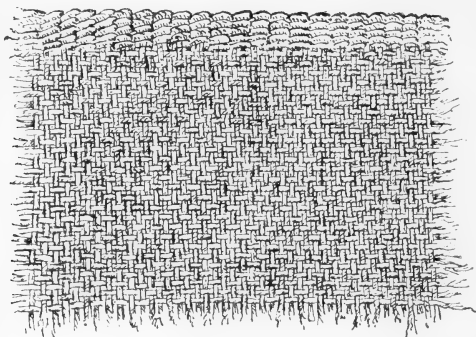


Fig. 2.—PORTION OF GARMENT (natural size).

an oblong, cloth, which was wrapped round the body below the arms. Mr. Black said that there were some remains of leather-straps, and some round objects "like beads or buttons, but these all crumbled away at once." What these can have been, we cannot say. Beads are likely to have been more durable; and there is no trace of a buttonhole on any of the fragments. Buttons made of pieces of the cloth, such as occur in the case of much later garments in the Academy's collection, would not have crumbled away as described. It may, perhaps, be noticed that this garment bears some general resemblance to the woollen, unshaped garments, held in place by a narrow band or belt, which were found in coffins made of the hollowed trunks of oak-trees at Vamdrup and at Borum in Jutland, figured in Worsaa's "*Industrial Arts of Denmark*" (figs. 44 and 65). They are ascribed to an early period of the Bronze Age. In any case, this is, I believe, the first instance of woollen cloth found in Ireland which can be definitely ascribed to the pre-Christian period.

The most remarkable object in the find is the horseshair, tassel-like

ornament (Plate XII.). There seemed to be no doubt that it was horsehair; but to remove any possible uncertainty, Dr. Scharff, Keeper of the Natural History Department of the National Museum, kindly made a microscopical examination of a fragment of it, and had no hesitation in pronouncing it to be horsehair. It may be added that it is uniformly black in colour, like ordinary black horsehair, so that black appears to have been the original colour, and not due to the staining of the bog. I mention this, as it may have some bearing on the species of the horse. The information given Miss O'Connor left her under the impression that, when found, this object lay on the cloth in the form of a Maltese cross. There is, I think, reason to doubt that this was so, or, at least, that it was intentional. The two fringe-end pieces (Plate XII., figs. 1, 2) are single, but the remaining fragment (fig. 3) is double. The fringe-pieces appear to have been the two ends of this double piece. The stuff is somewhat contracted and creased just above the fringe, which gave me at first the impression that they were the ends of a scarf; but, on consideration, the creases seem due to the pieces having been pinched between the finger and thumb when taken out of the bog, and the pasty nature of the bog-stuff, of which the creases were full, had glued them together when dry. But, in the case of the third fragment (Plate XII., fig. 3), the gathering at the top was evidently made for fastening or fitting it in place, and the two pieces of which it is made probably hung partly behind each other, and could not have been separated in the form of the arms of a cross. Thus, either a large portion of the object has been lost, or there has been a mistake in supposing it to have lain with four arms like a cross. From the account of how the objects were found, it is plain that the finders could have had only a hasty look at them in the bog, and that they were then partly disturbed. Miss O'Connor says that in using the spade three of the pieces composing the horsehair ornament were injured. In a previous letter she states that one man showed something in Ballycastle "which from the description must have been portion of this ornament." If the fragment shown in Ballycastle was not quite a different piece, it may well have been a portion of the fringe of the fragment (fig. 1) which has lost the greater part of its fringe.

The skill with which this horsehair ornament is made is beyond praise, and throws an interesting light on the textile arts of the period. The weaving of the horsehair is very even, and worked in a chevron pattern. The fringe is formed of bunches of horsehair, closely wound round for a short distance, then separated into lesser bunches

also wound, which are again separated into branches, wound as before, about $1\frac{1}{2}$ inch long, and terminating in neatly-made pellets. The fringe is attached to the web of single stuff by a horizontal horsehair-band which goes round it, and between which the ends of the bunches of the fringe are inserted. (See Plate XII., figs. 1, 2.)

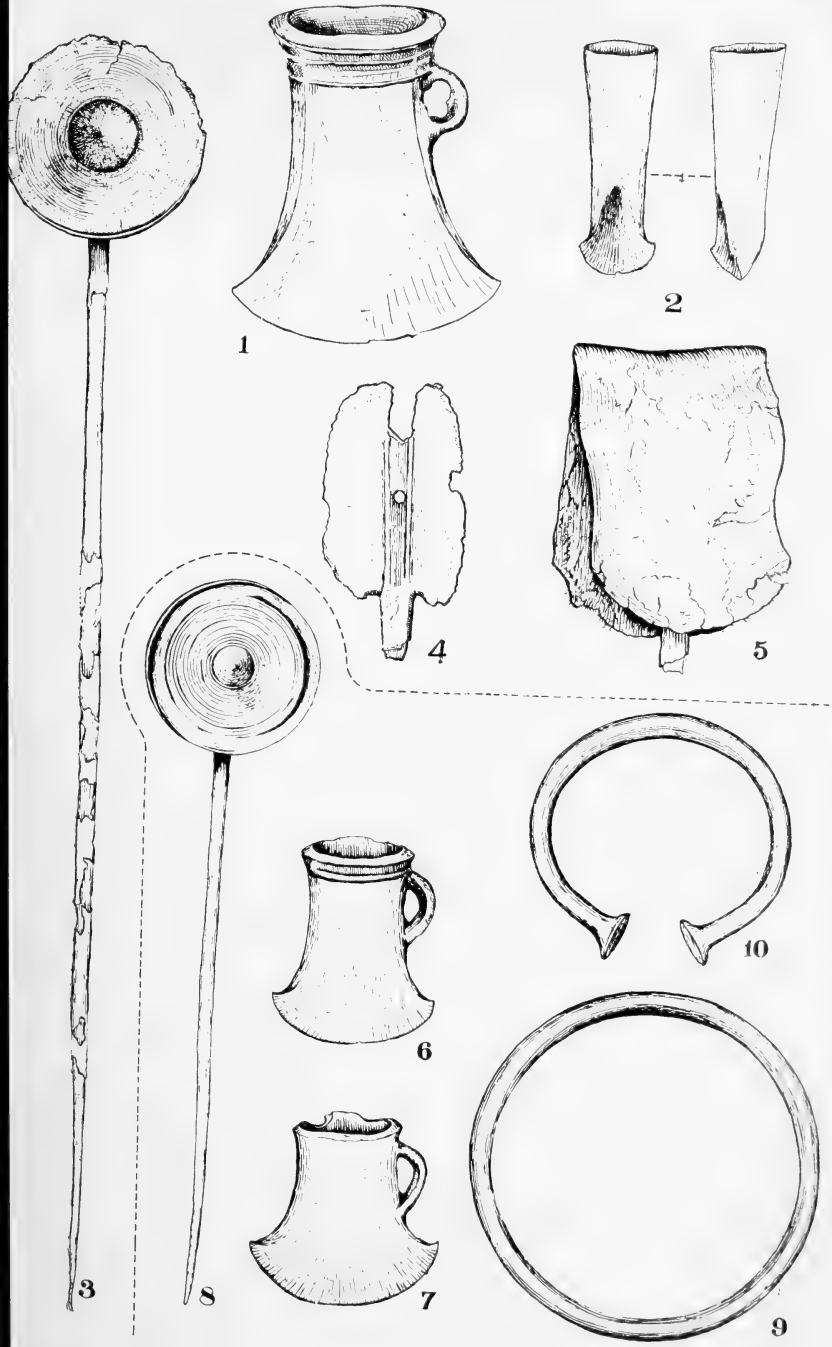
The fragments of wood need little more than mention. They are too few and incomplete to afford any clue as to what they belonged to. The wood is about $\frac{3}{16}$ inch thick, and has been shaped; one piece has a small hole.

I take this opportunity to figure another "find" of the same period, from the opposite end of the country, which has been in the National collection since 1861, but has not been published before. The circumstances under which the objects were found are not stated. The only record is that of the register, which states that they were found in the parish of Tulla, County Clare, on the 25th May, 1861, in the bog in the townland of Lahardown, at a depth of 7 feet, and were bought from James Moroney, the finder.

The objects consist of:—Two small, socketed celts, 2 inches by $1\frac{5}{8}$ inch, and 2 inches by $1\frac{7}{8}$ inch; a disk-headed pin, similar to that in the last find, but shorter; length, $7\frac{3}{8}$ inches; a plain, bronze ring $3\frac{1}{2}$ inches in diameter, and $\frac{3}{4}$ inch thick; and a bronze fibula, an unclosed ring with expanded ends, $2\frac{1}{2}$ inches in diameter. (See Plate XI., figs. 6 to 10.)

The only object that calls for special notice is the fibula. These fibulæ are common in gold in Ireland, but rare in bronze. The expanded ends are often cupped, but several are known with plain, flat ends, such as this bronze example. The occurrence of one with the socketed celts and the pin shows that, although this unclosed-ring form of fibula may extend back in time to an earlier period, it was still in use towards the close of the Bronze Age.

The bronze objects, socketed celts, &c., in both finds are well-known Late Bronze Age types; and the form of the pins, with conical centre and concentric circles, serves to approximately date both finds. The use of pointed rivets, and of centres with concentric circles, is common at the end of the Bronze Age; and we may provisionally place these finds in the period between 400 to 800 B.C. The cloth and horse hair ornament are evidently of the same date as the other object found with them.



Two Late Bronze Age Finds ($\frac{1}{2}$ linear)





Late Bronze Age Horse-hair Fabrics, from Armoyn, Co. Antrim ($\frac{1}{2}$ linear).



VIII.

BARNABY RICH'S "REMEMBRANCES OF THE STATE OF IRELAND, 1612," WITH NOTICES OF OTHER MANUSCRIPT REPORTS, BY THE SAME WRITER, ON IRELAND UNDER JAMES THE FIRST.

By C. LITTON FALKINER.

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THE author of the ensuing "Remembrances," Captain Barnaby Rich, is well known to students of the early seventeenth-century history of Ireland as a prolific and withal somewhat polemical contributor to the history of Irish affairs at that period. He is also, and perhaps better, known to a wider circle as an author not without some significance in the history of English literature. Born before the close of Henry the Eighth's reign, and surviving to the middle of James the First's, Rich passed a long life in active employment as a soldier, at first in the Low Countries, and later, from about the year 1577, in Ireland. Rich was a characteristic, though scarcely an eminent, illustration of the facility with which the soldiers of Elizabeth could exchange the sword for the pen. He forms one of that notable group of Elizabethan men of letters closely connected with Ireland, in which Spenser's and Raleigh's are the most illustrious figures, but which includes such lesser lights of literature as Sir Geoffrey Fenton, the translator of Bandello's novels; Ludovic Bryskett, the friend of Spenser, and one of the lyrists of 'Astrophel'; Barnaby Googe the poet; and Sir John Davies, who first won with his poem of 'Nosce Teipsum' the literary fame which his book on Ireland enlarged and preserved. The list of Rich's printed works, which are twenty-four in number, occupies, even after a rigorous abbreviation of their inordinately lengthy titles, as many as four columns of the careful memoir which Mr. Sidney Lee has devoted to their author in the "Dictionary of National Biography."¹ But although he is not without merit as a

¹ Besides the notice in the "Dictionary of National Biography," a careful account of Rich will be found in the Introduction to an edition of his "Honestie of this Age," prepared by Peter Cunningham for the Percy Society in 1844.

writer of English prose at a period when English prose, still in the making, was struggling to free itself from the shackles of the pedantry of Lyly and his school, it is probable that Rich's chief interest for posterity has hitherto lain in the fact that it was to his version of one of Bandello's novels, printed in "Rich, his Farewell to Military Profession," that Shakespeare was directly indebted for his plot of "Twelfth Night."¹

Like those of most of his class and period, the opinions of Rich upon Irish affairs were those of an ardent combatant, in the field of letters as well as in that of arms, on the English and Protestant side in the great European struggle in which Philip of Spain and Elizabeth of England were the protagonists. At the period when the "Remembrances" here printed were written, the Plantation of Ulster had been completed; and the statesmen of James the First were seeking, for the moment at least, to administer Irish affairs with something more of consideration for the vanquished party than had been evinced for more than a generation. It is necessary, in reading Rich's observations, to remember that they were written in old age by an ultra-Protestant survivor of the Armada period, to whom all symptoms of toleration were profoundly distasteful. No one, accordingly, need go to his writings for an impartial view of the contentions of the time, or for an example of tolerance in the theological sphere. Rich's merits lie in other directions. Of all Elizabethan or Jacobean writers on Ireland Rich's acquaintance with the country was the closest and most continuous. His first visit was paid during the government of Sir Henry Sidney, in 1577; and he died in Dublin exactly forty years later. His second publication, the "Allarme to England," printed as early as 1578, was written in Ireland, and is largely occupied with Irish affairs; and some half dozen other works, concluding with "The Irish Hubbub," published in 1617, are principally conversant with the same topic. Thus, not only did Rich enjoy ample opportunities during a residence of forty years in Ireland of exercising the faculty of observation which he undoubtedly possessed, but his mind was occupied throughout that long period with the problems of Irish government as they presented themselves to a man of action who had seen much of the world and was intimately involved in Irish affairs. While, therefore, many deductions have to be made from the value of his reports and descriptions on the score

¹ This work, published in 1581, was reprinted for the Shakespeare Society in 1846.

of prepossessions and aversions which he took not the slightest pains to conceal, Rich's knowledge of the Ireland of his day cannot be disputed; and as he could put his impressions on paper with clearness and point, he is undoubtedly an eye-witness whose testimony is worth attention. “The New Description of Ireland,” first published in 1610, and dedicated to Robert Cecil, Earl of Salisbury, is perhaps the best-known of his works to students of Irish history; some passages of it, relating to the social condition of our metropolis under James the First, having been printed by Sir John Gilbert in his “History of Dublin.” It is a good example of Rich's style, and was written primarily to arouse the interest of the merchants of London in the Plantation of Ulster then in progress. Rich had long been stationed in Ulster on military service, and the “Preliminary Epistle” to his book, addressed to one William Cokyne, a London alderman, gives a capital account of the physical capacities of the province and the conditions under which the Plantation was effected.

The “Remembrances” to which attention is here directed form one of a series of papers addressed by Rich in his latter days, between the years 1606 and 1616, to Sir Julius Caesar, at that time Chancellor and Under-Treasurer of the Exchequer in England. All of these, but particularly one entitled “The Anothomy of Ireland in the maner of a Dialogue, truly discovering the State of the Country, for Hys Ma^{ties} Especcyall Service,” afford fresh and valuable information. The “Anothomy,” which is written in dialogue after the style adopted by Spenser in his “View of the State of Ireland,” contains much that is entirely new about persons and things in the Ireland of James the First, and expands many of the statements made in the “Remembrances.” It is a document much too lengthy for inclusion in the “Proceedings” of the Academy; but considerable use has been made of the information contained in it in the annotations to the “Remembrances.”

The historical value of the latter document consists chiefly in the particulars it contains concerning the administrative system existing in Ireland in the writer's time, and in the light it throws upon the conduct and character of sundry eminent official personages of that day. It is to be regretted that Rich has left us no appreciation of the great Attorney-General, Sir John Davies; but with this exception, all the more important officers of the Irish Executive in 1612, from the Lord Deputy, Sir Arthur Chichester, down to the Clerks in the Court of Chancery, are noticed by him. The “Remembrances,” being in the nature of a confidential report for the information of the

British Treasury, contain frank and sometimes far from complimentary criticisms of men and measures in Ireland; and the writer is particularly severe upon the defects or abuses which he notes in the legal tribunals of the country. Altogether the document serves as a useful commentary on the well-known work with which it is so closely contemporary, Sir John Davies' "Discovery," and forms an interesting addition to the available sources of information concerning the administration of this country in the reign of James the First.

I have endeavoured in the notes to explain such allusions and resolve such obscurities as seem to require observation. The text has been accurately transcribed from the original manuscript, which is among the Lansdowne Papers at the British Museum.

REMEMBRANCES, BY CAPTAIN BARNABY RICH,
CONCERNING THE STATE OF IRELAND, 14 AUG. 1612.

LANSDOWNE MS. 156, No. 6.

CAESAR PAPERS.

TREASURY.

TO THE RYGHTE HONORABLE S^R

JULIUS CEASER KNYGHT ETC.

I have p̄sumed to p̄sent yoū ho' wyth thos intelygences for hys M^{ties} service in Ireland wythowt any respect eyther of love or hatred borne to any man, the whych to set downe accordyng to a trwth would aske a large and a longe dyscourse but knowyng that an Item to yoū ho' is as much as a volume may it please you to understand as foloweth :

OF SOME IMPEDYMENTES THAT HATH
E^u MORE BYNE HYNDERYNGE TO THE
PRYNCE SERVICE IN IRELANDE.

The combynation between the Englyshe & the Iryshe by fosteryng & marryeinge contrary to the statutes of that realme¹ hath e^u more byne so p̄iudicyall to the servyce of the prynce as p̄sydent^e w^e infynit here to be inferred when murther treason Rebellyon and a man^{er} of contemptuous demeananances towards the prynce shall be bouldered & borne owt by the Englyshe & when hys Ma^{ty} at

¹ The Act for Marieing with Irishmen, 28 Hen. VIII., cap. 28.

ho' counsayll her in England shall rather receyve letters of excuse then trwe informatyons of any mysdemeanances of the Irysh towards hys Ma^{ti}. Thys combynatyon is the mayn poynt that Ireland wyll styll remayne as it hath done, not only repugnant to hys Ma^{tis} lawes, but also a charge to his Ma^{tis} purse

OF P^DONS & PROTECTYONS. HOW HURTFULL
TO THE SERVICE OF THE PRYNCE.

For thes 40 yeares togyther that I have knowne Irelande, thys onely portseale of p^dons is it that hath set so many rebellyons on foote, & it not yet all owt two yeares agoe synce I sawe 1020 sevall mens names conteyned in one p^don. I knowe not how benefyciall it is to hys Ma^{ti} thys lyberall grantinge of p^dons, but I am sure it is made a matter of great profyt to thos that be hys officers, for he that hath mony to gyve can newl want a p^don, thys maketh the Iryshe so hardy to enter into ungracyous actyons. And then ther be a n^umber of poore needy knyghtes & many other favouretes that doth nothyng else but hunte after sutes, that are styll redy to begge p^dons, to begge felons goodes, traytors goodes, forfytures of recognyscances, wardeshypes, intrusyons, & all man^r of casualtyes. And thes matters are styll gyven away to thos unworthy p^sons of small or no deserte, that other wyse myght be converted to hys Ma^{tis} great benefit.

but it is no great wondre though a thief a murtherer or a traytor shuld helpe themselves by compassynge of a p^don, but that a Lorde Chanceler, a Justyce, an At^urnny, a solycyter, a kynges surveyor gen^lall, or any such other offcyer that is in especyall trust for hys Ma^{tis} servyce, & that any of thes should seeke to purchace p^dons for fraud, for decept, for brybery, for forgery & for such other misdemaunces towards the prynce as some of them have done (& whereof I have some copyes to showe) it seemeth strange. Amongst the rest Parsons that is his Ma^{tis} surveyor gen^lall hath had two sevall p^dons, and that very lately. but yf thys prohybytyon wer imposed that whosoe^r of hys Ma^{tis} offcyers that shuld but offer to make sute for any such p^don myght p^resently upon the facte make forfeiture of hys offyce his ma^{ti} would be much better served in Irelande than now he is.²

² In a later report to Sir Julius Caesar, written in 1612, under the title of 'The Anothomy of Ireland,' Rich has the following further observations on pardons:—"And it is truth that as these pardons have been the only encouragements to give daring to traitors to attempt against their prince, so they have been again the very cause of dismay, whereby to terrify a subject from the serving of

OF THE L. DEPUTY OF IRELANDE
THAT NOW IS.³

It is well knowne that the L deputy of hymself is a most worthy gentyllman, no lesse zealous in relygyon, then euly way inclynge to the servyce of his Ma^{ty}, but as Irelannde was yet neu^{ly} free from coruptions, so ther wanteth not at thys present houre thos that be of the takynge humoure wherof some no infery^{or} p^{er}sons besydes needy knyghtes & others that be folowers & in favoure wyth the deputy, that for gyftes and rewardes doth sometymes obtayne thos sutes & induce thos courses that are but lyttell for hys Ma^{ty}s profyt.

here agayne it is to be considered that the L deputy knowynge that uppon the deli^ury of hys Ma^{ty}s sword havynge but a meane estate of lyvynge in Englande hys place of habytatyon must be to rest in Irelannde to make hym self therefore to be the more gratyous amongst the Iryshe is the more safely wrought te tolerat wyth many abuses amongst the Iryshe.

OF THE L CHANCELER OF IRELANDE.⁴

The L. chanceler of Ireland that is lykwyse Bysshope of Dublyne, I must confesse I neu^{ly} hard any great matter objected agaynst hym for any misdemeance in the courte of Chancery, but as he is Bysshope of Dublyne it cannot be hydden hys toleratyng wyth popery when Dublyne itselve (where he is dayly resydent) doth swarme wyth popysh prystes and when it is well knowne that throughowt the wholl yeare ther be more masses in Dublyne then ther be sermons.

OF THE WORTHY TREASURER OF IRELAND
S^r THOMAS RYDGEWAY KNIGHT & BARONET.⁵

Greater comendacyons then hys owne desertes hath meryted I

his sovereign, for where a traitor is out in rebellion, those that are bordering upon him, that have the best knowledge in the fastness and strength of his country, dare not serve against him, for they know well enough that, in the winding up, a pardon will be obtained; and then those that have given any manner of assistance to the service of the prince shall be sure to smart for it." Lansdowne ms. 156, No. 7.

³ Sir Arthur Chichester, Lord Deputy of Ireland, 1604-1614.—Vide "Dictionary of National Biography," vol. x., for an excellent notice by Dr. S. R. Gardiner.

⁴ Thomas Jones, Lord Chancellor of Ireland and Archbishop of Dublin, 1605-1619.—See "Dictionary of National Biography," vol. xxx.

⁵ Afterwards Earl of Londonderry, Vice-Treasurer of Ireland, Master of the Hawks and Game, 1608-1631.—Vide *Ibid.*, vol. xlviii.

knowe not how to give hym, I may therefore conclude that for a deputy and a Treasurer Ireland was neuer better sped than now it is.

OF THE L CHEEF JUSTYCE OF IRELANDE.⁶

I myght speake the lyke of that worthy gentyelman, that is now the Lorde cheefe Justyce of Irelande, by whom that courte of hys Ma^{tis} Benche is now the thyrd tyme [? term] made happy.

OF THE L CHEEF JUSTYCE OF THE
COMON PLEAS IN IRELANDE.⁷

A man of lyttell hurte, that lyves wythout offence to any, yet suspected to be a papyst and a secret frend to assyst popery. And although hym selfe in the tearme tyme doth use to follow the L deputy to church, yet his wyf could neuer be brought to Church And an offyce belongynge to the courte of comon pleas that is in hys gyft namely the keapinge of the sealle, he hath bestowed of a most obstynat knowne papist and such a one as almost eu^{ry} sunday through the yeare hath a mass sayd in hys house.

OF UNWORTHY PERSONS PREFERRED
TO OFFYCE IN IRELAND.

before I speake of inferyor offycers in any p^ticular manⁿ. wyth all humblnes I crave p^don fyrst to set downe what formⁿ experyence hath taught, whereby it doth apeare, that ther is nothyng more hurtfull to the serveyce of a sou^{er}aygne, than when unworthy p^{er}sons have byne advanced to offyces of trust, whos bare and needy estate hath byne a spure to prycke them forward to brybery & to all manⁿ of other corupt dealynge: let me here yet once agayne besech a p^don but to set downe thys one p^{re}sydent, how in the late raygne of our most gracyous Quene duringe the tyme of Tyrones rebellyon one

⁶ Sir John Denham, Lord Chief Justice of Ireland, 1612-1617. He had previously held the office of Chief Baron of the Irish Court of Exchequer, and subsequently became a Baron of the English Exchequer. Denham was a lawyer of considerable distinction, and was one of the Judges in Hampden's case. He was the father of the poet Denham.—Vide *Ibid.*, vol. xiv.

⁷ Sir Nicholas Walsh, Chief Justice of the Common Pleas, 1597-1615. In Perrott's Parliament, Walsh had been Speaker of the House of Commons. See a notice of him in "The Parliament of Ireland under the Tudor Sovereigns," in "Proceedings," vol. xxv., sect. c., pp. 541, 542.

Newcome⁸ that cam into Irelande a poore servyng man (neyther of reputation nor any great acounte) yet atteyning to be vytualer to the Army, he sodaynely begane to buyld, to purchase, & so to florysh, that eu^ry man could say it could not be but by abusynge the Quene but thus it contynued tyll the L Borough⁹ was sent over deputy, who calling Newcome to a streyght account & examynynge hys servyces what courses he had houlden, found so many colusyons, how he had deceyved both prynce and souldyor, that for the example of all other, he protested to hange hym, whych he thought to have pformed indeed, but that he was hastely to set forwardes a jorny, in the whych he dyed before he retuⁿed backe. Newcome that had well fethered hys neast found meanes to gratyfy hys form^r crymes, & was very shortly after made knyght, and it is well knowne that at thys p^rsent houre Syr Roberde Newcome is one of the rychest Englyshe knyghtes that is in all Irelande :

yf it pleased hys ma^{ty} to folowe thys p^rsydent used by the L Borough he myghte fynde the mystery from whence it is that hys officers do wax so ryche & hym selfe so poore :

OF HYS MA^{ty}S SOLYCITER THAT
IS NOW IN IRELANDE¹⁰

To speake of some feew officers that be now of the tyme p^rsent, it is well knowne, that he that is now hys Ma^{ty}s solyciter, wythyn

⁸ Sir Robert Newcomen, appointed Victualler-general to the Army, 1591; received a fresh Patent as General Purveyor and Issuer of Victuals, 1604. See as to his extravagant profits Cal. S.P. (Ireland), 1597-1598, p. 495.

⁹ Thomas, fifth Lord Burgh or Borough de Gaynesboro, K.G., Lord Deputy, 1596-7. He died at Newry, October 14th, 1597, while on an expedition against Tyrone, aged forty-two. Cal. S.P. (Ireland), 1596-1597, p. 415.—Vide "Complete Peerage," vol. ii., p. 77.

¹⁰ It is noticeable that Rich omits all mention of so eminent and important an official as Sir John Davies. Probably he both disliked and feared the Attorney-General, whose credit in England stood too high to be shaken. In another of his reports, written a year later, Rich pointedly censures Davies' "Discovery," which had appeared in 1612, as unduly optimistic in its account of the security of the country, and the obedience rendered to the law throughout the country:—

"There is nothing that hath more deceived our late Queen and her honourable Council here in England than those informations that were many times given out of Ireland; and I might speak of a book that was but lately presented to the King's Majesty wherein was expressed how Ireland was never conquered till now, and how his Majesty may only vaunt himself to be the Conqueror of that realm; for that now the country is brought into that quiet subjection that the

thes feew yeares, then called by the name of Robert Jacobe¹¹ maryed a sailers wydowe of southampton called by the name of Mall Target, as famous of reporte in the towne of southampton as Mall Neubery in the cytty of London: thys Jacobe comynge into Irelande in a poore & needy estat, & lykwyse in debt to dyuse cytyzens of London, found meanes (by the helpe of frendes) to becom hys Ma^{tis} solycyter, And shortly after (for hys wyves sake that before she cam into Irelande had hydden defyance to modesty) he got to be made knyght when he had neuer a foote of lande, neu a house, nor so much as a bedde of hys owne to lye uppon.

And although it be conceyved by many that it is not Syr Robert Jacob's purse that hath sythence borne owt hys wyves excessyve bravery, hyr pompe, hyr pryde, hyr prodygalyte, hyr roystynge, hyr rampynge, hyr revelynge, hyr feastyng, hyr gamynge and other hyr idell & inordynat expendynge, yet it is agayne as credyibly beveled that hys Ma^{tis} revenue doth somethynge fare the worse for it, and that now in thys late busy tyme of thys passyng of lands by the comyssyon for defectyve tytles, that Syr Robert Jacob's hand hath passed to many bookes that were but lyttell to hys Ma^{tis} advantage.

It is well yenough knowne that when Syr Roger Wylbrowne¹ supplied the place of the Quen's solycytor in Irelande the wholl parquysytes of hys offyce amounted not so much in one wholl yeare, as Syr Robert Jacob's lusty wyf wyll play at a payre of cardes in a peece of a nyght.

laws had their recourse through all the parts of Ireland, so that all was quiet and in a peaceable security: when in truth his Majesty's laws were disobeyed throughout the whole realm of Ireland, and Dublin itself could not be reformed, but there was every day masses and massing priests walking openly in the streets without controlment; and when it is very well known that the Irish were never more maliciously bent against the prince, and that they do but watch their opportunities when his Majesty should be molested either with foreign war or civil dissensions, for these be the times when the Irish doth ever more take their advantages.” Report of Barnaby Rich to Sir Julius Caesar for his Majesty's especial service in Ireland, 12th June, 1663. Lansdowne ms. 156, No. 62.

¹¹ Sir Robert Jacob, Solicitor-General, 1606-1618. Sir John Davies, whom Rich omits to notice in these “Remembrances,” was Attorney-General throughout Jacob's tenure of office; and the latter died before Davies vacated the higher position.

¹² Sir Roger Wilbraham, Solicitor-General, 1586-1603. See as to the emoluments of his office the Queen's Letter of 19th April, 1586, and the letter of the Lords of the Council of 13th February, 1585, printed in Smyth's “Law Officers of Ireland,” p. 175.

OF HYS MA^{tis} SURVEYOR THAT IS
NOWE IN IRELANDE.¹³

The surveyor that now is, who was sometymes Syr Jefery Fenton's¹⁴ man from whom he got the offyce, although he had neu^rer byne trayned uppe in the knowleadge belongynge to a surveyor, yet he hath so well surveyed for hymselfe, that wythin thes feew yeares that he cam to hys offyce he hath gotten a greater cyrquet of landes (& that wythin one dayes jorny of Dublyne) then all the surveyors that hath byne in Irelannde for thes 40 yeares before hym. As he hath used dylygence in gatheryng of landes, so he hath byne as industryous to provide for afterclapes; for he hath gotten two seu^lall pdons, and amongst other crymes that thes pdons must serve to sheltre I am sure he hath not forgotten for brybery and deceypt. but amongst such offycers as thes, ther is neu^rer a xli that is taken for a brybe but is tenne tymes twenty owt of hys ma^{tis} cofers. Of hys maⁿ of surveyenge I shall haue after ocasyon to speake of a lyttell, whereby it may apeare what the more hath byne.

HOW HYS MA^{tis} REVENUES HAVE
BYNE LATELY IMPAYRED IN IRELANDE.

And although for example's sake I shall here but infere a p^sydent or two how hys ma^{ti} hath byne wronged, yet uppon a farther search, ther myght some other matter fall owt that myght gyve lyght for hys Ma^{tis} profyt :

landes
rec^ded at
4li 10s
nowe sur-
veyed &
passed in
fee farme
at xviiiid p
ann.

I wyll fyrst begyne wyth a mylne scytuat undre the Castell of Dublyne that at thys p^sent houre & duringe the tyme of a lease for 5 yeares yet to com, doth yeld hys Ma^{ti} iv li x s. str of a small rent, the reu^ocyon of whych mylne Syr Rychard Boyle¹⁵ hath now lately passed in fee farme surveyed at 18d per an. Such maⁿ of surveying ther would much more be found owt yf good search wer made. Ther is yet agayne the maⁿ of Monohan sometymes farmed by

¹³ Sir William Parsons, 1570-1650, afterwards the well-known Lord Justice of Ireland during the Rebellion, held the office of Surveyor-General from 1602 to his death in 1650. See "Dictionary of National Biography," vol. xliii.

¹⁴ Sir Jeffrey Fenton, 1539-1608, the well-known statesman and author, was Surveyor-General from 1591 to 1602. Vide *ibid.*, vol. xviii.

¹⁵ Sir Richard Boyle, 1566-1643, afterwards the well-known first Earl of Cork. Vide *ibid.*, vol. vi.

Captain Henshoe,¹⁶ payenge to the quen's Ma^{ti} that late was 40^{li} rent lands p an. str., besydes other servyces that he was tyed unto, amountynge rec^ded at 80^{li} nowe well neare to 40^{li} more, whych rent Captain Henshoe (so long as he surveyed & lyved) very duly dyscharged, as it apeareth by the rowles of hys passed in fee ferme at 55 shillings. Ma^{tis} revenue. It was but lately farmed by Syr Edward Blancy¹⁷ for a tearme of yeares at the yearely rent of fyfty fyve shellyngs but now Syr Edward Blaney surrenderynge hys lease, under coloure of that comyssyon for defectyve tyteles, hath passed it in fee ferme, at the said rent of 55s wythowt any other duty reserved to the kynge.

I myght speake here of certeyne composytyon mony that hath in Conaught 3000 lib of co²position. byne demynshed in many places, but namely that in Conaught hath used to pay the 500^{li} & do keape backe the other 3000^{li} to them selves. Thys was the costum very lately, how it is reformed I knowe not. mony diminished.

OF SOME ROYALTYES BELONGYNGE TO HYS MA^{tis}
ESTATE IN IRELANDE THAT ARE PASSED AWAY

Leavyng to speake of some Royalties that haue eu²more belonged to the upp houldinge of hys ma^{tis} estat in Irelannde, namely of 1000 Irysh peckes of corne that was passed away to one, and now latly hys Ma^{tis} house of Kylmayname¹⁸ past away to an other, I wyll breffly set downe how hys Ma^{ti} hath byne defeated, not onely of an anuall rent, but lykwyse of such a royalty as yf after oca syon of warre shuld fall owt in Ireland myght very yll be spared: It pleased hys ma^{ti} uppon a specyall sute made unto hym by the Earle of Tomonde to make a change of so much lande amountynge to the yearely value of one 100^{li} rent p an. Now here is to be noted that one 100^{li} landes p an. as it is surveyed for hys ma^{ti} is at all tymes worth so much more. The Earle togyther wyth the lande mad choyce of the castell of cartholough¹⁹ whych castell beyng a royalty belongynge to the kynge

¹⁶ Captain Thomas Henshaw, appointed seneschal of Monaghan for his long services in Ulster in 1591. See "Fiants of Elizabeth," No. 5690, 16th Report of Deputy Keeper of Records in Ireland. See also Shirley's "History of Monaghan."

¹⁷ Sir Edward Blayney, created, in 1621, Baron Blayney of Monaghan. See Lodge's "Peerage," vol. vi., p. 307.

¹⁸ The Priory of Kilmainham, known since its resumption by the Crown under Stat. 2 Eliz., cap. 7, as his or her Majesty's house at Kilmainham, had been granted to Sir Richard Sutton, Auditor of Imprests in 1609, and by him assigned to Sir Edward Fisher in 1611. See a paper on the Phoenix Park in "Proceedings," third Series, vol. vi., p. 470.

¹⁹ On 14th July, 1604, a grant was made to Donogh, 4th Earl of Thomond, in

serch for
that bond.

& a speeyall place for garysone in the tyme of warre, ther is flat prohybytion by acte of pliament not onely of that castell by name but lyke wyse of dyu^{se} others, that no man whosoer⁹ he be that is of Iryshe byrthe, shuld eyther haue costody or any manⁱ of comānd over them: the Earle havynge passed thys Castell, togyther wyth the lande made back agayne to the kyng the Abby of Golbery & entered into bond hymself & Syr Rychard Boylle that it shuld rendre hys ma^{ti} an anuall rent of one 100^{li} p an. but now very lately the rente was behynd unpayd for dyu^{se} yeares togyther, and although ther were processe issued owt it could not be levyed, and for the bond that was gyven in by the Earle & Sir Richard Boylle it could not be founde.

I myght yet speake of some other Casteles & houses that contrary to the statutes of Irelande are houlden by such men as are not capable of them by lawe

HOW HYS MA^{ti} HATH BYNE DEFEATED UNDR
THE COLOUR OF THAT COMYSSYON FOR DEFECTIYVE TYTELES

Thys comyssyon for defectiye tyteles whych it pleased hys Ma^{ti} gratyously to grante in releefe of the subiecte was converted onely to hys ma^{tis} dysadvantage, when the greatest numbre that undre the p^{te}ntence of mendynge ther tyteles have altered ther tenures to hys ma^{tis} p^{te}iudyce, not onely dymynyshynge some pte of his ma^{tis} rente but haue lykewyse defrauded hym of some pte of hys ryght & haue freed ther landes from wardshippes & from many other servyces & duties belongynge to the kyng. As Syr Edwarde Blane for one, who fyrst havynge but a lease of Monohan for tearme of yeares, hath now chopped it to a fee fearme therby wpyng away more then a hundred markes p an from hys ma^{ti} & hys heyers for eu⁹. Syr Edward Fytz Garrat²⁰ in lyke man⁹ that by hys Ma^{tis} leters shuld haue passed Balla Boggyn in fee fearme, hath converted it to a fee symple, therby defeatyng hys Ma^{ti} of all the rente and all other

consideration of his surrender of lands in Limerick and Tipperary. This grant included "The manor of Catherlogh or Catherlagh, the old castle with four turrets on the east of the Barrow, with the precincts and buildings thereto belonging excepted—the custom of a salmon yearly out of every net used in taking salmon in the Barrow, running by the bounds of the said castle—and the demesne lands within the site and circuit of said manor in Carlow and Queen's County." Ryan's "History of Carlow," p. 120.

²⁰ Sir Edward FitzGerald, of Tecroghan, received in 1599 a grant of the reversion of the Priory of Ballybogan, Co. Meath. See "Fiants of Elizabeth," No. 6327, *loc. cit.*

duty. The Earle of ormonde hath lately passed landes to one Walter lawly wherin (as it is sayd) ther hath byne great colusyion used wherby to defraud hys ma^{ty}. I myght speake of the Earle of Tomond, & syr Richard Boyle between whom ther was some covert dealyng (& as some do thynke counterfeyt dealyng); but I my self sawe a rowle of pticulers to be passed that was above vi yardes longe brought undre the Earle of Tomonde's name, but a great pte of the landes well yenough knowne to be syr Richard Boyle's.

Howsomeeu⁹ thys passyng & repassyng of landes hath byne handeled for hys ma^{ty}'s benefyt, it hath byne a good mylch cove to some of hys learned counsayll & no lesse avayllable to hys ma^{ty}'s surveyor gen^lall.

HOW HYS MA^{ty} IS OVERBURTHENED WYTH
SOME EXPENCES MORE THAN NEDETH.

Hys ma^{ty} myght be well eased of one charge of 40^{li} p an that is payed out of the revenue to the Clarke of the casualtyes,²¹ an offyce that was yet never put into excutyon nor neu⁹ dyd the kyng one peny worth of profyt.

Ther are two other offyces namely the colector of the Impost & the Controuler of the same that haue between them 15^{li}²² per an for doynge of just nothyng, hys ma^{ty}'s imposts of that realme beyng farmed owt, the composytyon is payd to hys ma^{ty}'s Treasurer, thos offycers neyther to make nor medle in the matter.

Ther be yet other offycers as well as some penyion's that wyl not com to church & therefore I thynk unworthy of ther payes. but amongst other unnecessary expences wherwyth hys ma^{ty} is most over burthyned is thys gen^lralyte of concordatums when it is a matter of ordynary amongst thos that haue great payes and stypendes belongyng to ther places, yet yf they ryde but one daye Jorny to do

²¹ The office of Clerk of the Casualties, or collector of the casual profits of the Crown in Ireland, was created in 1579, in favour of Sir Edward Waterhouse, an eminent official of his day. Waterhouse was succeeded in 1594 by Ludovic Bryskett, the poet. In 1603, "Mr. Bryskett being proved by inquisition not to have duly exercised this office either by himself or his deputy," one Thomas Hibbotts was appointed at a fee of £40 English, "until the King should think fit by reason of his care and pains to increase his salary." Hibbotts was succeeded in 1613 by one Christopher Conway, who appears to have been the last occupant of this sinecure. *Vide* "Liber Munerum," vol. i., part ii., p. 143.

²² In the "Anothomy" this sum is stated at £90. I can find no record of these offices.

the kynge a lyttell serveyce they wyll have a concordatum for extraordinary expences.

OF THE INSUFFCYENCY OF SOME CLARKES
BELONGYNGE TO SOME OF HYS MA^{tis} COURTES.

It hath pleased hys ma^{tis} to dygnyfy the cheef Judges of thos courtes wyth honourable tyteles as they be in Englande²³. but the courtes themselves are undygnyfyed agayne by the insuffcyency of inferyor Clarkes ther unto belongyng. In the courte of coimon pleas ther is one man²⁴ that hath ingrosed the wholl offyces apteynyng to vi seūall psons & houldeth them all in hys owne handes no lesse hurtful to the kynge then inconvenyent to the subject that is a suter.

The lyke agayne in hys ma^{tis} hygh courte of Castell chambre called here the court of stare chambre wher an ygnorant man posseseth five or syx seūall offyces,²⁵ that is not able to execute any one of them acordyng unto a due course & forme of lawe, but comyteth many errours as it coimonly faleth owt almost eūry court day. The lawyers that be pleaders at the barre for the greatest nombre of them are Iryshe, arrogant papystes that wyll neyther com to church, nor take the oathe of obedyence; & that a company so malytyous & repugnant to hys ma^{tis} lawes shuld be suffered to make a benyfyt of hys ma^{tis} lawes I leave to you⁹ ho' consyderatyon.

OF OFFYCERS BELONGYND TO CYTTYES &
TOWNES CORPORATE IN IRELANDE.

Ther is not a Cytty in Irelande (no not Dublyne itself) that is able yeare after yeare, for two yeares togyther to make choyce of a mayore & two sheryves that wyll take the oathe of obedyence to hys ma^{tis}; but to speake of inferyor offycers as notaryes, sargantes, cunstables, jaylers & such other lyke in Dublyne wher they are most conformed, I knowe not any of thes but is a papyst that on suneday mornynge wyll fyrst

²³ Under Elizabeth the heads of the three Common Law Courts were sometimes, but not usually, knighted. Under James the First, they were invariably so honoured.

²⁴ Apparently one William Crowe, who held at this period the offices of Prothonotary, Autographer, and Custos Brevium in the Court of Common Pleas.

²⁵ Perhaps Anthony Stoughton, Clerk of the Court of Castle Chamber, 1586-1626.

heare a masse then after that they wyll brynge the mayor to Christ-church & havynge put hym into hys pew they convey themselves to a taverne tyl the sermon be done, that they brynge the mayor back agayne to hys house²⁶. If I be here a lyttell teduous I besech you^l h' to p̄don me, for now I do speake for the glory of god & yet no lesse for the servyce of the kynge, for it is strange that in Dublyne wher the worde of god hath byne so plentyfully preached, that they shuld make no better choyce but of such offycers for the servyce of hys ma^{ti}, but such as wyll impugne hys ma^{tis} lawes, but they will say a papyst may be a good subiecte, yet I would knowe but what they do thynke whyther at Rome or at Remes or wher some eu^l other wyse wher popery beareth sway, whyther they would put a knowne protestant in comys^syon or in any man^l of authority for the servyce of the pope.

May it now please you ho' to undrestand the frutes of ther servyce that do not onely execut ther offyces to the great detryment of hys ma^{ti}, but also when any of hys best affected subiectes that haue conformed them selves to hys ma^{tis} proceedinges, yf he shall lyght into the laps eyther of a sargant, a cunstable or a jaylor that is a papist he shall be afflicted & exacted on wyth more rygore & crewelty, then yf he wer amonge Turkes or Jewes.

Wher contrary yf a papyst be brought in questyon (althoughe some tymes for hys dysobedyence towards hys prynce) ther is scarce an offycer that wyll do hys duty to ap^hend hym, nor a jayler that wyll scantell hym wyth that short allowance belongynge to an offendre but wyll rayther enterteyne hym as a frend and the more repugnant he sheweth hym self agaynst hys ma^{tis} procedyngs so much the more favours the jayler wyll showe hym.

leavyng to speake of infynit p^sydentes that myght be inferred concernyng thes matters let me besech but one example how hys ma^{ti} hymself was handeled now very lately about certeyne landes in the county of Waxford that had byne long deteyned from hym, And beyng now brought to a tryall of lawe in the county itself the jury would in no wyse fynd for hys ma^{tis} ryght, although the evydence gyven them was most pregnant & aparant, Wher uppon the jury was brought to Dublyne, wher as well by the testy[mony] of recordes as by such other evydence as was ther gyven in the

²⁶ On this point the writer of these "Remembrances" has dwelt at large in his "New Description of Ireland," chapter xvi.

matter made playne & owt of all questyon the jury notwithstandinge in no wyse would be brought to fynd for the kyng, wher uppon the L deputy was dryven to impanell a new jury of the most choycest men that wer in the shyre, who uppon ther booke & othes gave the kyng hys ryght.

INTO WHAT P^sUMPTYON THE PAPYSTES
IN IRELAND ARE NOW GROWNE UNTO.

That it myght please you ho' to undrestand a trwth into what p^sumptyon the papystes of Irelande are now lately growne unto, I besech you to p^don me the settinge downe of two or thre p^sydentes concernynge that matter.

not longe sythens wythin two myles of Dublyne a dead corps beyng brought to be buryed, the mynyster of the parysh p^sentyng hym self to do hys duty acording to the p^scryptyon of hys ma^{tis} lawes was not onely wythstode but was lykwyse so beaten & brused that it had lyke to haue cost hym hys lyfe, and a popysh pryst brought in that buryed the corps acording to the popysh man^r. The very lyke was offered in the towne of Waxforde wher the mynyster was beaten that he kept hys bed many monethes after. And now very lately a mynyster at Waterford comynge to churche to haue p^lched was ther assaulted & so beaten that he kept hys bed a long tyme after, very hardly recoverynge hys lyfe.

I myght speake of many other lyke pranckes that haue byne played in diuse ptes of Irelande, but lettynge them passe, I wyll com to Dublyne it self, wher not long sythens a dead corps was caryed to the buryall wyth a crosse borne openly through the streates before it, and where it is well knowne they haue masses eury sunday through owte the wholl yeare, wher they wyll threaten hym that doth but offer to fynd fault at yt, and wher notwythstandynge the late proclamatyon set forth by hys ma^{tis} for the avoydance of prystes, they are styll reteyned & the proclamatyon scoffed at

WHO THEY BE THAT DOTH UPF HOULD PRYSTE'S
AND DOTH SO COUNTENANCE POPERY IN IRELANDE.

The pryncypall pyllers that doth enterteine prystes & gyvet support & countenance to popery in Ireland are thos whos names d after folowe

The baron of delyvne²⁷

Syr Chrystofer Plunket³⁰

The baron of gormistowne²⁸

Syr Thomas fytz wyllyams³¹

Syr Patrycke Barnewell²⁹

Syr Garratt Elmer³²

Thes six are they that do not onely countenance popery by all ther indevours, but most especyally by ther yll example, and thes sixe are they who yf it would please hys ma^{ti} to drawe over into Englande and here to confyne them, he shuld so weaken the popysh factyon. that the rest would becom to be more tractable. But for matters of relygyon hys ma^{ti} shall neu^{ly} reform Irelande yf he do not fyrst reform thes or at the least restrayne them.

THE OPTUNYTE OF TYME AS IT IS
NOW OFFORED TO HYS MA^{tie}

Now is thē tyme for hys ma^{tie} eyther to reduce the Irishe to be conformable to hys lawes & procedynges or to benyfyt hymself of many thowsandes by the yeare by ther dysobedyence.

OF THE CARYENGE AWAY OF CORNE LETHER
AND OTHER VYTUALL & IRYSH COMODYTYES

Amongst other of our Irysh comodytyes that are rayzed to a

²⁷ Sir Richard Nugent, 15th Baron Delvin, afterwards (1621) 1st Earl of Westmeath. See "Dictionary of National Biography," vol. xli.

²⁸ James, 5th Viscount Gormanston. His mother was Catherine Fitzwilliam, a daughter of Sir Thomas Fitzwilliam, mentioned in this list, whose second husband was Christopher, 4th Viscount Gormanston. See Lodge's "Peerage," vol. vi., pp. 194, 195.

²⁹ Sir Patrick Barnewell, d. 1621, father of the 1st Viscount Kingsland. See "Dictionary of National Biography," vol. iii.

³⁰ Probably Sir Christopher Plunkett of Dunsoghly, an eminent lawyer, and a member of the Dunray family of Plunketts. He also was a son of Catherine, daughter of Sir Thomas Fitzwilliam, whose first husband was James, eldest son of Sir John Plunkett of Dunsoghly, Chief Justice of the Queen's Bench from 1563 to 1582.

³¹ Sir Thomas Fitzwilliam, or Fitzwilliams, created (1629) 1st Baron Fitzwilliam of Thorncastle, and Viscount Fitzwilliam of Meryon. See Cokayne's "Peerage," vol. iii., p. 383.

³² Sir Gerald Aylmer, Knight, afterwards (1621) created a baronet. He was a brother-in-law of the Lord Delvin mentioned in this list.

The noblemen and gentlemen named in this list were all of them members of the ancient territorial aristocracy of the Pale, whose several families were closely, and sometimes curiously, related and connected. It will be noted that the Viscount Gormanston and the Sir Christopher Plunkett here mentioned were uterine brothers, and grandsons of Sir Thomas Fitzwilliam.

dearthe by thys transportation into spayne³⁸ & other countryes, it is pytty ther shuld not be a restreynt of corne durynge the tyme tyll the plantatyon be throughly setteled.

OF THE SPOYLL OF TYMBRE IN IRELANDE

The woodes & tymbre in England beyng thus spent & consumed yf hys ma^{ti} shuld haue any ocaseyon to bwyld shyppe (whych wer some tymes esteemed for the walles of Englande) he could not be better fytted wyth tymbre then in Irelannde the whych is now made spoyll of and cut into pype staves, & so carryed into spayne, and, especially in thos places whych are nearest to the seasyd, the whych of all other is most necessary & behovefull for hys ma^{ti}, but yf thys spoyll be contynued as it is begune yf hys Ma^{ti} shuld haue any after ocaseyon about hys navy he shuld fynd the want of yt.

CONCLUSION.

I haue hitherto p^osumed (wyth all humblness & duty to p^osent your ho' wyth thos informatyons whych I haue indeuoured as well for hys ma^{ti}s seruyce as in respect of that dutyfull zeal I do bear to you, who beyng now a pryneypall pyller of the comon wealth I haue therefore p^osumed to inform you wyth thos matters that doth so hyghly concerne the especyall good of our Irysh comon wealth. And wyl eu^o rest to do you farther seruyce durynge lyf.

IX

THE ANCIENT CASTLES OF THE COUNTY OF LIMERICK¹
(CENTRAL AND SOUTH-EASTERN BARONIES).

BY THOMAS JOHNSON WESTROPP, M.A.

[PLATES XIII.-XV.]

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THE second portion of a survey of the castles and peel towers of Limerick² is intended to cover the Maigue valley and the adjoining baronies down to the Galtees. The Connelloes are reserved, because their natural and historical unity marks them off from the rest of the county. We, therefore, now examine Kenry and Pubblebrian, on the Shannon, Coshmagh, which completes the Maigue valley, Small County, and Coshlea, the latter leading us up into the beautiful glens of Aherloe and Cloghnodfoy, under the great peaks of the Ballyhoura Mountains and the Galtees. Several places of especial interest are included—the towered rock of Carrigonnell, the Desmonds' Castles at the ford of Adare, and at Lough Gur, and the venerable Kilmallock. We also are brought to such notable early sites as Knockaney, Knocklong, and Duntrileague. We have made one slight alteration in treatment by putting into their proper topographical positions notices of certain traditional or badly attested sites of castles; but we are careful to mark them as “doubtful.”

¹ Continued from p. 108, *supra*.

² A full table of contractions is given, p. 74, *supra*. For ease of reference we repeat the principal:—A.F.M., Annals of the Four Masters; B.B.L., Black Book of Limerick; B.D., Book of Distribution; C., Castle; Dep., Deposition; Des. R., Desmond Roll, 1583; Fi., Fiant; Inq., Inquisition (Chan., Chancery; Exch., Exchequer); Len., Lenihan's “Limerick”; P.R.O.I., Public Record Office, Ireland; R., Rolls; R.I.A., Royal Irish Academy; R.S.A.I., Royal Society of Antiquaries, Ireland; S., Survey (D., Down; O., Ordnance).

PUBBLEBRIAN.

The present name (so far as we can ascertain) appears to have come into use in the fifteenth century under the rule of the O'Briens of Carrigunnell. The upper part formed, with part of Clanwilliam, the lands of the Tuath Luimneach and O'Gunning family. It appears after the Norman settlement as Aeschuana, Esclon, and Askelon, and covered most of the parishes of Kilkeedy, Mungret, and Knocknegall, or Crewmalley. The latter was the land of the Ui Mhaille tribe, while the Ocholchur lay round Crecora; though O'Huidhrin regarded this place as Aes-tri-muige in 1420, the Norman Estermoy certainly lay much farther northward. Corcamore covered southern Kilkeedy from the brooke Gyle and Carrigunnell to Faha and Barnakyle. The O'Briens held the greater part of this district, perhaps from the middle of the fourteenth century, under some almost nominal recognition of the Earls of Desmond. Their lands are so carefully specified in Elizabethan documents that we can see that Pubblebrian (save for a portion of Knocknegall added before 1655, and a portion of Mungret added since that date) in 1583 differs very little in extent from the present barony.

KILKEEDY.

106. CARRIGOGUNNELL (4). Marked. 1209 "Carrac Ui Conaing,"¹ granted by Charter to Donchad Cairbreach O'Brien, Prince of Thomond (Ann. Inisf.). The C. is said to have been occupied by the O'Briens in 1336 (Inq. Exchequer, 1, 1536). It has been supposed to be the C. of Esclon,² but is nowhere identified as such. 1426 Teige O'Brien, "na glenore," ancestor of the O'Briens of Carrigunnell, died (A.F.M.). 1502 Donough O'Brien, Lord of Pubblebrian and Aherloe, died (A.F.M.). This "strong Rock and House of Defence" of the O'Briens only appears in history in 1536. When the Parliament adjourned that year to Limerick, Edward Lord Grey, the Deputy,

¹ It is not marked in the map of 1567, but appears as Carrig Gunning in Hardiman Map, No. 63. The name is given as Carykgonyn by Mercator, ed. Hondii, 1606 and 1636, "Hiberniæ pars australis."

² Archdall says that Carrigogunnell was a Templary. No authority discoverable for this statement. The "Candle" name appears in 1536. The legend is given by Hall and Crofton Croker. Nearly all the "history" of the former is mythical. Hall's "Ireland," vol. i.

marched to a very strong C. called "Carekogunyel," "in English, Candell Rock," which was surrendered next day by Mat. (Mahon) O'Bryne, on condition that the Government should hold it themselves. "It stands on a high rock, and . . . is the key of all the County," with the manor, "which belongs to the King as part of Lord Clerres lands."¹ Grey, despite his pledge, was about to entrust it to Donoth O'Brien, but "by crafty policy and a former letter of my Lord"² it was given back to Matthew. On August 22 the Lord Deputy besieged it. The ordnance was "bent" on the gate of the base court, which was soon taken. The guns were then "bent on the dungeon of the great Castle." That night a tower in the upper ward was taken, and at dawn the keep surrendered. As the Deputy had first summoned it on pain of death, he hanged Edm. Cahill and all its defenders after trial in Limerick (Carew MS., i., pp. 104-5; C.S.P.I., 56, 65; Inq. Exch., 1). 1539 It was taken from Donough O'Brien for extortion (C.S.P.I.). 1541 Mahon O'Brien used to claim a penny for each barrel of wine, and two pence on other barrels imported to Limerick (Inq. Exch.). 1580 Called "Carrig Gunning" C. (Hardiman Map, 63). 1584 It was held by Donough's son, Brian Duff, who was confirmed in nearly all Pubblebrian (Fi. 4486, 4615). 1615 He died, leaving a son Donat (Inq. Chan., 15B). 1638 Daniel O'Brien held the manor and C. with other lands. This Donough, or Daniel, was "of Downe," and third cousin of Brien, whose son Donough he succeeded, 1632. (Inq. Chan., 215). He married Margaret, daughter of Ric. Stephenson and his wife, Margaret, daughter of said Brien Duff. The C. does not seem to have played any part in the wars. In 1651 Capt. Wilson paid Morris King £7 for building a stable there (Hartwell's Accounts, P.R.O.I.). 1655 It had been sold by Donough to Michael Boyle, Archbishop of Dublin (B.D., p. 63), and had a C., bawn, a few thatched huts, and a salmon fishery (C.S., xxxii., p. 29). 1666 Confirmed to Boyle (Act. Sett.). 1691 Held by garrison of 150 men,

¹ If this be Richard de Clare, we can only suppose that the English Government regarded all the O'Briens as holding their lands under him, for neither Esclon nor any other place in that part of County Limerick is named among the records of the de Clares: see Trans. R.I.A., xxxii. (c.), p. 191.

² The Inq. Exch., No. 1, lays the blame of this transaction on E. Sexten and his wife; but the Government seems to have attached little weight to the finding of the jury, who were possibly jealous of the large grants of Church lands and other favours heaped on Sexten. The Inquisition is unusually vivid, and full of information.

who surrendered to Sgravenmore. It was blown up in September, 1698 Held by Boyle, then Archbishop of Armagh (Terrier, P.R.O.I.).¹

Fabric.—It stands on a lofty plateau of igneous rock; but the buildings are of limestone, and well dressed. The keep is to the north-west, with five stories, and over 50 feet high; its north side was circular, but is now levelled. The south wing has a perfect staircase of sixty-five steps. To the west is a fragment of a later house three stories high, with cross-barred window, fireplace, and high end-gable. A range of buildings over 100 feet long ran from the keep along the cliff to the south-west. It has four rooms with a garderobe and cell called the "Dane's prison." East of this wing is a paved upper court, with turrets; one to the south, with a stair, has been blown nearly off its base. The lower court is rough and craggy, the cliff being walled all around. There is a gateway to the south-east, a corner turret to the south, and an oblong house, two stories high, to the north-east. The walls enclose a little more than an acre. No reliable views have, to our knowledge, been hitherto published.² The main buildings seem earlier than 1400. There are poor views in Grose, Bartlett, and Hall.³

CORCAMORE GROUP.

107. BALLYEGHTRAGH (12). UNKNOWN. In 1583 Guille duffe mac Donnell Gauco mac Brian Boye O'Brien held eleven Castles in Corcamore, including Ballyeghtragh C.⁴ (Des. R., 35B). The great changes in Kilkeedy prevent us identifying the sites; but the high authority of the Desmond Roll carries assurance, though, except perhaps for Clarina, we find no other record. The land of Ballyeghtragh adjoined Millick, and lay on the Maigue with the Goyle brook to the north, *i.e.*, on the northern edge of Corcamore townland (D.S.B. 26; C.S., xxii., p. 27). 1615 Ballyeghtrach was held by Brian Duff (Inq. Chan., 15B). 1655 It had been mortgaged by Conor mac Dermodie mac Mahon (O'Brien) to W. Roche, who held it with "s

¹ Dyneley, R.S.A.I., ix., p. 89, calls it "A fair Castle called Carrigogunnell situate upon a hill, belonging to his Royal Highness (James, Duke of York), rented by the present primate," 1680.

² View, Plates XIII., XIV. Plan, Plate XV.

³ I have more fully described and illustrated this castle in a paper submitted to the R.S.A.I. in June, 1906.

⁴ Mahown Merigath O'Brien held it under him (*Ib.*, p. 38).

chimnie house, a few thatched cabins," an orchard and weir (C.S., p. 27).

108. BARNIARDE (12). Unknown. 1583 Castle Barnard in Corcamore (Des. R.). 1655 Geo. Creagh held Barniard, or Barneard. It, with Ballibegg and Cahermore, lay in Corcamore, between southern "upper" Millick and Carrigogunnell, *i.e.*, it adjoined Doon Townland, and lay east of Carrig View House (C.S., p. 25; D.S.B., 26).

109. BALLYBEG (12). Unknown. 1583 C. named. 1655 It lay, with Barniard, north of Doon, between Carrig View and Vermont, in Corcamore, and was held by Creagh (*Ib.*).

110. KILNACALLY, or Elm Park (12). Not marked. 1201 Kellnachallichy belonged to the church of Limerick (B.B.L., No. xxi.). 1410 Keilnacailly, near Claireene Bridge ("Torn Rolls," White MS.). 1583 Kynecally C., Corcamore (Des. R., 35B), Mahon Merigath (O'Brien) held it (*Ib.*, 38B). 1655 Don mac Mahon (O'Brien) of Cragbege held it. It corresponds to the western and middle part of Elm Park (C.S., p. 19). It was purchased by Hugh Massy of Duntrileague, "Elm or Kilnekelly," 1757 (will in Dublin Reg., B. 187, No. 127227), and is the residence of a branch of that family, the Barons of Clarina.¹

111. CLARINA (12). Not marked; perhaps the last, or Cnockrounye, or Ballybrown. 1215 Clarani in Esclon. 1410 Bridge of Claireene (White MS.). 1621 Clarenny, with one C., in Poblebrien, late estate of Jas. Sexton, granted to H. Holcroft (Pat. R., No. xxxiv.).

112. BALLYEAGHERA (12). Unknown; probably in Ballycarney. 1583 C. named. 1640 Lease to J. Dowglass of Ballyvolloge and Ballycherna. 1655 He claimed the interest on behalf of his wife (daughter and heir of F. Sexton) and their daughter, against H., Earl of Bath (C.S., p. 21).

113. MEELICK, in Corcamore (12). Not marked. 1583 Myellig C. 1655 Meelick and Balytragh (D.S.B., 26), Millicke and Bally Ightragh, held by W. Roche and Marg. Bryne, with one Chimnie House and orchard. It paid chiefry, four shillings and four white groats, to the Earl of Kildare (C.S., pp. 27, 28). The C. was probably at Meelick House, the old "Meelick upper."

¹ The Masseys were an ancient Cheshire family, deduced from Hamon de Masci, governor of Windsor about 1100. General Hugh Massy settled at Duntrileague after the war, 1651. His great-grandsons were Hugh, first Baron Massy, and General Eyre Massy, first Baron of Clarina.

114. **KNOCKRUNYN** (12). The eastern part of Elm Park. Not marked. 1583 Knockrunyn C. 1655 It adjoined Kilnakally on the east. Stephen Roche held Clarine and Knockrinia in fee-simple (C.S., p. 22). Cnockrynine with Clare Iny held by Marg. Byrne, *alias* Stephenson¹ (D.S.B., 26).

115. **FFENURE**, in Corcamore. Unknown. 1583 C. named. We find no other mention of the place.

116. **CAHERDUFF**, in Corcamore (12). Unknown. 1583 Carduff C. (Des. R.). Brien Roo O'Brien, of Lackyn, held it (Peyton, 215B). 1615 Tha: O'Brien of Attyffin held it (Inq. Chan., 15). Possibly the Cahermore at Barniard and Ballybeg (C.S., p. 25). Not Caherduff, near Monasteranenagh.

117. **BRISKAGH MORE AND BEG** (12). Not marked. 1583 Briskagh C. 1615 Broskeagh held by Brian Duff (Inq. Chan., 15; Inq. Chan., 1633, No. 94). 1636 Dan. O'Brien of Ballynoe C. held Broskeagh-begenkeough. 1655 or Broskeaghbrenikeagh. Donough was then deceased, and Marg. Bryne held it and Broskeagh more and beg (Inq. Chan., Car. I., 169, 170; C.S., pp. 16, 20, 23). T. Hallie held Broskeaghbeganikeagh (D.S.B., 26). It was perhaps in Briskaghbeg, where a ruined house stands in Faha Garden with a legend of a headless ghost.

118. **BALLYBROWN** (12). Not marked. 1583 C. named. 1655 Held by Marg. Bryne and G. Comyn (C.S., p. 23; D.S.B., 26). All these castles were probably small peel towers and stone houses.

(End of Corcamore group.)

119. **ESCLON**. Unknown. 1201 Certain lands in Escluona were held by St. Mary's Cathedral (B.B.L., p. 103). 1207 W. de Burgo granted Lesnernamadda in it to Bishop Donat O'Brien. Esclon extended from Newtown and Clarani, or Clarina, to Rathen. 1215 It was held by Almeric de Beaufo, to whom the king ordered R. de Burgo to give an exchange for the C. of Askelon. Walter de Lasey was disseised of it. In 1242 the manor was worth £37 11s. 6½*d* yearly. Extent given, Inq. xxvii., Hen. III. (Cal. Inq. post mort.) 1280 Ric., son of Walter, late Earl of Ulster, to have seisin of Esclone, as held by Emelina, the late Countess. 1309-1329 Thi Ric., Earl of Ulster, makes various claims on the manor and cantree (C.S.P.I., Pipe R., Plea R.). The Serle family held under de Burg

¹For the Stephenson family and this lady, see Journal R.S.A.I., vol. xxxiv pp. 129, 130.

1290 onward. The cantred is named down to 1377 (Pat. R.). Eschluana Parish, *alias* Kilkeedy till 1419 (Taxa. Proc., B.B.L.).¹

120. NEWTOWN (4). Not marked. 1283–1321. A series of law-suits of Simon Wallys and others holding “Neweton in Esclon,” or “de Esclon” (Pipe R., No. 14; Plea R., No. 131, &c.). 1502 Donough O’Brien was Lord from Adare to Limerick, and from Baile nuadh to Monasteranenagh, died (A.F.M.). 1636 Galfrid Galwey² died seised of Ballinoe more and begg, *alias* Newtown, which he had settled on D. Nihell (Inq. Chan., 181). 1657 Balinoc, an old C., demolished, with a fish-weir, late property of D. O’Brien (C.S., xxxii., p. 30). 1666 Confirmed with the C. ploughland to Michael Boyle (Act Sett.).

121. CLOUGHATACKA (13). Site marked near the Ferrybridge on the Maigne. 1583 Cloughytackie C. in Corcamore, Conor Moyle O’Brien held Cloughitackye (Des. R., 8, 40B). 1588 Granted to Ric. and Alex. Phitton (Fi. 5175). 1611 Sir E. Fitten granted the C. to T. Butler (Inq. Chan., 6B). 1657 The lands and stump of a C. held by Marg. Bryne, *alias* Stephenson, of Carrigoguinnell (C.S., xxxii., p. 18). 1669 Confirmed to W. Barker (D.S.B., 16; and Act Sett.).

122. CORBALLY (5). Not marked. *Circa* 1215 Patents of John and Hen. III. refer to ten ploughlands and a hospital for “Leapers” at Corbally (Inq. Chan., 12B, Jas. I.). 1377 Tenements called Minster in Corbally granted for repair of the House of the Friars Preachers, Limerick (Close R., No. 20). 1583 C. at Courtbrack³ and an old C. which belonged to the said (Black) Abbey, and adjoins a hamlet called Corbally. It was “ruinous and badly situated on the lower part of a certain moor,” and held by G., Earl of Desmond (Des. R., 7; Inq. Exch., 11). C. granted, 1586, to Earl of Thomond (C.S.P.I., p. 311). 1589 To Rob. Anstey (Fi. 5347). 1600 By Jas. Gould, at his death T. Gould and Phil. Field enfeoffed Edm. England in it (Inq. Chan., 13A). 1618 A. mac Dermod O’Brien and M. Bourk, his wife, enfeoffed W. Creagh f. Martin in hamlets of Caherkeilgeneragh and Corbally (Inq. Chan., Car. I., 23). 1621 Sir W. Parsons got it (Pat. R.). Not to be confused with the north-eastern Corbally, near Limerick.

¹ See notes by J. Grene Barry and T. J. Westropp, *Journal R.S.A.I.*, vol. xxxiii., pp. 197–9.

² See section 8, *supra*. Also *Journal R.S.A.I.*, vol. xxviii., p. 42, for this family.

³ Courtbrack, see No. 23, *supra*.

MUNGRET.

123. CASTLE MUNGRET (13). Marked. 1201 Mungaret belonged to the church of Limerick (B.B.L., p. 14), having been granted by Donald O'Brien, King of Limerick, *ante*, 1194, "Imungram ab arcu usque ad terram Imailin (Ballyclough) et a vado cenii usq' ad fluminem sinanum" (B.B.L., No. xxix.). 1216 Ten carucates of land in Mungareth, and ten in Omayll, with the natives, which the citizens of Limerick held, were assigned by G. de Marisco to the Bishop (*Ib.*, 46, 119). 1225 A market was established on the manor of Mountgarret by Bishop Hubert de Burgh (C.S.P.I.). 1336 A full survey of the manor made for Bishop M. de Rupefort. The tenants were Coke, Rhys, Lewe, White, Butler, Lofte, Ogealvayn, Odowayn, Ocrynan, Ocarthany, Ocoggan, Ohibyle, Oconnyn (Gunning), Omolcassill. "Villa y molcassill, a castro domini usque ad Bilycomide" (Rental, B.B.L., p. 138). It was lost to the see, and was eventually confiscated. 1583 C. and vill of Monrenett (Des. R., 7B). There were two towers there (Peyton, p. 25). Castle Mungaratt was recovered before 1621 by Bishop Bernard Adams (B.B.L., p. 148). 1653 Capt. Jos. Cuffe held Castle Mongret (Hartwell Acct. Book, P.R.O.I.). 1655 Castle Mungret and Temple Mungret, respectively, held by David Roche and H. Bindon¹ (C.S., xxix., p. 30). The latter family long held the lands with Clooney, Co. Clare. The Bishop's lands were C. Mongrett, Knockane, Twordell, Ballykee, and Templemungrett (B.D., p. 106).²

Fabric.—Only the vaulted basement remained in 1840 (O.S.L., 9, p. 33).

124. CLOUGHKEATING (13). Not marked. 1336 Ric. Keating (Rental). 1586 Clogh Akeatyn C., lands of Murrough mac Moriertagh O'Brien, tanist of Poblebryan (Peyton, p. 254B). 1587 Grant to Sir E. Fyton, of Tirvowe, the C. and lands of Cloghkettin, Rahan, &c. (Fi. 5032; Inq. Exch., 47). 1611 Sir W. Agard held the C. of Cloghketting transferred under W. Carter's Patent (Inq. Chan., 6B). 1657 Marg., Lady Dowager of Castleconnell, held Cloghenkeaten and Illen Ivowana with the broken C. (C.S., xxix., p. 29; D.S.A., 1). 1669 Confirmed to David and H. Bindon (Act Sett.). 1757 Sam. Bindon, of Templemungret, settled Cloughkoka and Cloughkeating, *alias* Ballynoe (Dub. Reg., B., 185, p. 600).

¹ For the Bindon family, see Journal R.S.A.I., xxi., p. 78.

² Lenihan, p. 538, gives a circumstantial tradition, making the Castle a House of Templars, who "occasionally did garrison duty at Carrigogunnell."

125. CREGGANE (4). Not marked in Skehacreggaun. 1336 J. Scoler held lands near the old C. of Creggane, given after Cloghkeating and Island duane (Rental). 1656 Lands held by N. Stritch (C.S., xxxii., p. 26).

ST. MICHAELS.

126. BALLINACURRA (13). Not marked. 1590 T. Arthur died, seised of the Castles of Reibogg, Delishe, and Ballywiline (Inq. Chan., 17). 1634-1633 Nic. Arthur held Dwylish, Rathmichell, and Crewe Iwally (*Ibid.*, 12, 112). 1624 Sir W. Parsons held Dewlishe or Beallancor C. (Pat. R.). 1657 Beallnacorrie, a broken C. and mill-seat on the brook Corkanrye, late estate of T. Arthur (C.S., xxix., p. 22; and D.S.A., 1-10).

KNOCKNAGALL.

127. DERRYKNOCKANE (13). Not marked. 1536 Lord Grey captured Deryknockan C. from "Claudus, *alias* Teig baccagh" and other O'Briens, "mere rebels, public robbers, and malefactors," but was restored (it is alleged by a plot of E. Sexten, who was bribed by Teige, it is said, with a grant of the park and a chamber in the C.), and had to be retaken (Inq. Exch., 2). 1594 Stephen Sexten held the lower "Bedd Chamber" in it (*Ib.*, 50). 1607 Dom. Roche held C. (Inq. Chan., 2A). 1634 Dan. O'Brien of Carrigogonnell held C. at his death, and devised it to David Bourke of Kilpeacon (*Ib.*, Car. I., 211). 1657 The broken C. (C.S., xxix., p. 27).

128. CREWALLY OR BALLYCLOGH (13). Not marked. Before 1194 King Donald granted Imalin to the Cathedral (B.B.L., p. 21). The lands often named as Omail, Creuagh-Omail, &c. 1230 Bishop Edmond granted them to J. de St. John (C.S.P.I.). 1336 Crew Ymaille held by T. de Valle (Rupefort's Rental). The C. is given separately from Derryknockane in the Perambulation Deed, &c. 1615 Crewe Iwally, *alias* Ballynielogh, held by Chris. Arthur¹ (Inq. Exch., Jas. I., 29; and Chan. 12B; see also C.S., xxix., p. 28).

Fabric.—A fragment 8 feet thick to north of the house stood 1840 (O.S.L., 8, p. 395).

KILPEACON.

129. BALLYSHANE (22). Not marked. 1625 Donat O'Brien, of

¹ For the Arthur family, see Journal R.S.A.I., vol. xxviii., pp. 41-45.

Ballymoroghoe (Ballymurphy), held Ballyshane C. (Inq. Chan., 94). 1657 Ballishane, in Kilpichane, stump of C. held by M. Bryne (D.S.B., 21-23).

BALLYCAHANE.

130. BALLYCAHANE (22). Marked. 1281 Henry de Berkeley (Mem. R. Exch.). 1295 Pardon at instance of H. Berkeley to Edm. de Berkley for death of T. f. Ralph (Justic. R. Cal., p. 70). 1321 Suit of Anastas, widow of H. de Berkeley, and Roger, her son, as to dower on same and Dromassill (*Ib.*, 133, m. 8). 1336 H. Berkeley held it. The family continued in possession. Their ancestors held it from And. Le Yngles. Brian duff or Barnaby O'Brien had ravaged their land (Inq. Exch., 28). Among the mayors and sheriffs of Limerick we find several members of this family. 1378 Thomas Barkly was bailiff. 1402 Laurence Barkly was mayor of Limerick. 1524 The Earl of Kildare gave Edm. Byrkley a bay horse (App. 9 Rep., p. 285). 1578 Henry Brickelie died seised of Balleichan, Dromassell, &c.; his widow, Elizabeth Brickelie, *alias* Bonfield, and their son Edmund are named (Inq. Exch., 4). 1589 Edm. "Bricklea" died, seised of the C. of Ballykahan, Cnockdromassell, and Corbutt; his son Henry, aged 21 (Inq. Exch., 22, 281). 1620 Henry Barkly was chosen mayor and deposed the same day. 1655 Held by Fra. Barkly, sold to Geo. Peacock (B.D., pp. 55, 56; C.S. xxxii., p. 7; D.S.B., 22-26). 1667 Ballycahan N. confirmed to latter (Act Sett.). Lenihan, giving no authority, says that the C. was built by an O'Grady in 1400 (p. 59).

Fabric.—It lies to the west of the church; is 40 feet high, with walls 4 feet thick, and had three stories, the lowest, vaulted, 27 feet by 18 feet. At the north-west angle is a turret 52 feet high (O.S.L., 8, p. 237).

131. BALLYREGAN (22). Not marked. 1186 Baliiriagain confirmed to Abbey of Magie (C.S.P.I.). 1583 C. held by T. Burgat in Ballechahen parish (Des. R., 7B; Peyton, 28; see also D.S.B., 22).

132. KILDONNELL (22). Not marked. 1655 C. shown (D.S.B., 22). 1667 Confirmed to Sir A. Ingram (Act Sett.), a doubtful site.

MONASTERANENAGH.

133. KILDERRY (22). Not marked. 1584 J. O'Cahisse (Casey), slain in rebellion, held the C., very ruinous (Des. R., 71; Peyton 214B).

KILLONAGHAN.

134. ATTYFLIN (22). Not marked. A residence and alleged C. of Flan O'Brien, *c.* 1500 (see legend, Lenihan, p. 307). 1583 Teig mac Gilladuff O'Brien held Attefloyne and Kahirduff (Des. R., 40). Brian Duff held Atiflewin or Artiflony (Fi. 4486-4615), and died 1615 (Inq. Chan., 15). 1601 Aweone O'Brien of Athiefloyn pardoned (Fi. 6487). 1638 It was held by Conor Keown and Donat or Daniel O'Brien (Inq. Chan., 94, 215). 1655 By Marg. Stephenson, *alias* Bryne (C.S., xxxii., p. 15; B.D., p. 59; D.S.B., 25). 1666 Granted to Duke of York, 1703, sold to Mountiford Westropp¹ of Kilkerin, County Clare (Trustee Maps, 1688, No. 4A). There was then a house, but no C. (R.I.A., Sale Books). The old house lay to the west of the modern one. There was a tradition of a battle near a burial-mound (see Proc. R.I.A., xxv. (c.), p. 380*n*), and of a castle near Annagh. A doubtful site.

CRECORA.

135. TONBAUN OR BEARNANE (21). Not marked. 1584 Bryan Duff held Byrryneyghie (Fi. 4486). 1633 It was held by Daniel O'Brien, and in 1655 by Marg. Brien. The C. shown near the north-west angle of Ballinvealla (C.S., xxxii., p. 10; D.S.B., 23; B.D., p. 57). 1667 Ric. Swete confirmed in Carrifulla (Jockey Hall), Buringehy and Graige (Greenmount). The name is now lost in "Tonbaun"; mears fixed from C.S.

136. BALLINVEALLA (22). Marked. 1583 Brien Duff held Ballymeilly or Ballynveylic C. (Fi. 4486; and Des. R., 7), which was granted to Edm. Manering, but recovered by Teige O'Brien (Inq. Exch., 25). 1622 Leased by Donat Earl of Thomond to Marg. mac Canna (Inq. Chan., Car. I., No. 62). 1657 Ballinvealla, the stump of a C. and a small orchard, Earl of Thomond (B.D., p. 57; and Act of Sett.). 1669 Confirmed to Arthur Upton (B.D., 57; and Act Sett.).

¹ This family was founded in Munster by Mountiford, younger son of Thomas Westropp, of Brompton and Stainsbye, Yorkshire (Will, London, 1657), who settled, 1657, in Limerick, and was appointed Comptroller of its port, Feb., 1660 (see Journal R.S.A.I., vol. xxi., p. 74; "Visitation of Yorkshire," 1586; "Testamenta Eboracensia," from 1346); his sons Mountiford, Ralph, and Thomas held Attyflin, Castleconnell, and Ballysteen, *q. v.*

Fabric.—The eastern wing of a larger peel tower stands; it is 26 feet by 14 feet, and 51 feet high, with four stories, a perfect spiral stair, porch, and vaulted rooms under a stone roof. Bond stones of the levelled “Court” project from the west wall (O.S.L., 8, p. 289). The wooden floors remained in 1874. It was traditionally an O’Brien C., and evidently of the late fifteenth century.

137. BALLYMURPHY (22). Not marked. 1300 Suits of Barth. and Elena Appelgard, with T. and Anastatia de Sancto Bosco and Jordan de Dykelyston, about lands at Balmoruth (Plea R., 52, m. 7), and 1315 of J. f. Ric. f. Ector and W. Appilgard, about pasture in Ballymorghith (*Ib.*, 138, m. 7). 1584 Ballyvorraghowe held by Bryan Duff (Fi. 4486; and in 1615, Inq. Chan., 15); he had granted the C. and bawn to David Bourke (1625, Inq. Exch., 94). 1655 The broken C. and bawn, Marg. Bryne (C.S., xxxii., p. 11; B.D., 57).

138. ASHFORT OR ANNAGHROSTIE (13). “Castle Field” marked. 1542 Anaroche held by Tege O’Brene (Carew, i., p. 202) and by Brian Duff, 1584 (Fi. 4486, 4615). 1600 N. Stritch held a moiety of the C. and surrounding wall or bawn of Annagh Rosin (Inq. Exch., 50, 54; Chan. 10A). 1609 The ford of Anagh Irestie and brook at Anagh Irestie (Perambulation Deed). 1657 It was then in Mungret, and lay near the stream opposite Greenmount (C.S., p. 11; Petty Map, 64; D.S.A., 1). 1667 Confirmed to F. Rolleston.

CROOM (part).

139. DROMASSELL OR TORY HILL (22). Not marked. 902 Asail fort was reserved to the King of Cashel (Book of Rights). Asail was said to be brother of Aenghus of Dun Aenghus in Aran. 1289 Drumassell at Crometh, held by Juliana, heiress of Maur. FitzGerald (Plea R., 14), and by the Berkeleys from 1321 to 1657 (see *supra*, section 130). Brian Duff, 1583, got head rent. 1640 Morris Brickley joined the Confederates. Fran. Berkeley sold it to G. Peacock. Cnock-droum Assill, with a fishing weir, by M. ffox; Lochneguirra, by F. Barkeli, C. shown in all the maps (D.S.B., 21, 24; C.S., xxxii., p. 5). 1667 Confirmed to Sir A. Ingram (Act Sett.).

140. CORRABUL (30). Not marked. 1655 Marg. O’Brien held Carabud, a broken C., sold to Sir A. Ingram and J. Newenham (C.S., xxxii., p. 5; D.S.B., 21; B.D., p. 54). 1669 Granted to Duke of York.

KENRY.

The district of Caenraige was the patrimony of *Ui Maelchallain* (Mulholland), and included that of the *Ui Beagha* or *Uibh rosa* of *Iveruss*. It is of but little early note, and is not mentioned by the Four Masters till the reign of Elizabeth. In about 1297–1300 appear records of a few suits of Symon FitzPhilip, the Stakepols, Maghrys, and others about lands in Kenry and Rossagh. In the sixteenth century much of Kenry was held by the Knights of Glyn under the Earls of Desmond. Almost the only events of note are the raids of the Adare Garrison, 1581, and the capture of Castletown from Sir Hardress Waller by the Confederates in 1642.¹

IVERUSS.

141. BEAGH or IVERUSS (3). Marked. 1237 Oros was an early manor of the Bishops (Proc. R.I.A., xxv. (c.), p. 388). 1295 Gerald and Anastas Staepole held Rossagh in Kenry. 1297 Suit of Ric. and Lucia Stakepol and T. de Maghry about lands in Rossagh, Rossaghrote, or Oros, with which the late John, son of T. de Maghry, had endowed his then wife, Lucia (Plea. R., 39, &c.). 1317 Suit of Phil. de Londres and Julian, his wife, against Walter Mauncel for dower on Oros (Mem. R., m. 42D). 1420 *Ui Rosa* or *Ui Beagha* (*O'Huidhrin*). In 1573 it was held by the Knight of the Glin (Valley), confiscated and granted in 1578 to Sir W. Drury (Fi. 3277), 1583 The C. and vill of Beahagh, Enbeough or Yearosse (Des. R., 74B; Peyton, 225). It was granted, 1587, to J. Stroude, and then to G. Beston and Lau. Bostock as "Cloveagh" or Beagha, and in 1592 to W. Carter (Carew, i., p. 449, 450; Fi. 5444–5717). 1619 The chief Ferry from Beagh to Ringannon in Clare, granted to Jas. Ware and W. Plunkett (Pat. R.). 1629 C. conveyed by Edm. Southwell to Ric., Earl of Cork (*Ib.*). 1657 C. of Beahy or Ballynahagulshy, Sir H. Waller² (C.S., xxvi., p. 25).

¹ I must record my special indebtedness to Dr. Geo. Fogerty for help as to notes and views of the Castles of Beagh, Shanpallas, Carriganea, Bolane, and Court. The Wallers have a view of the first, taken some seventy years ago; it has since been altered considerably. Miss Ellen Westropp, of Ballysteen, also took kind pains to procure me other information on Beagh, &c.

² Sir Hardress Waller, scion of an ancient family at Groombridge, Kent, a member of which (his lineal ancestor) took the Duke of Orleans prisoner at Agincourt. Sir Hardress married a daughter of Sir J. Dowdall of Killyny; their second daughter married Sir W. Petty.

Fabric.—A conspicuous tower on the bank of the Shannon. It consists of a peel tower (on a low ridge of horizontally stratified rock) with an outwork or large bawn having three vaulted rooms, loopholed towards the Shannon. It measures 23 feet by 17 feet inside, and has three stories, the lowest being vaulted. The staircase is in the south-east angle; the steps are perfect to the first floor; the west windows are broken out or modernised, except one small trefoil-headed slit. The tower is badly split to the east side, and has a later little enclosure on the river face and a natural cleft vaulted overhead with masonry (O.S.L., 8, p. 4).

142. BALLINVOHER (11). Not marked. 1583 Ballynboher C. in Egalusorisse, Terellagh Mantagh (Des. R., 36B). 1655 W. Roche held it (C.S., xxvi., p. 26).

143. BALLYSTEEN (11). Not marked. 1573 It paid headrent to the Knight of Glin (Carew, i., p. 435). 1578 Ballyvistine, or Ballistine, granted to Drury. 1583 J., son of Andrew, Dondon held the C. (Des. R., 32; Inq. Exch., 54, 55). 1591 The old C. granted to W. Carter, the Dondons still tenants. 1612 Terlagh Reagh, of Ballywokoge, settled lands on Joane (dau. of J. Dondon of Ballysteen), who married his son Donnell (Inq. Chan., 9, 6). 1623 Reserved from W. Aston's grant. 1629 Granted to Earl of Cork. 1642 T. Dondon of Ballyasteen plundered Maunsell of Court Browne (Dep. 303). 1655 Confiscated from Dondon; the C. was ruinous (C.S., xxv., p. 23; B.D., p. 31).¹ 1666 Granted to Duke of York² (Act Sett., Trustee Map, 6). 1703 Sold to T. Westropp of Bunratty, Clare, whose descendants hold it still.

KILCORNAN.

144. CASTLETOWN WALLER (3). Not marked. 1573 T. Knight of the Valley employed Jas. Dore, mason, "at the head of all the carpenters and masons of the country, to raze Castleton in Kenry and the Glan" (C.S.P.I.; see also Carew, i., p. 435); the place granted to Drury, Ballincastellane in Kyllkurnan. 1587 Granted to Beston and Bostock, and 1592 to Carter. The C. walls of a ruined hall, three messuages, six cottages, a garden, and mill (Fi. 5717; Des. R., 74B, 75; Peyton, p. 220). 1623 Grant to Edm. Aston, with similar recital (Inq. Chan., 15A). 1629 to Earl of Cork, conveyed to Sir J. Dowdall and others in

¹ Plate XIII.

² There seems no authority for the *alias* name "Ballystephen" in the 1666 grant, settlements, and deeds, 1708, 1729, &c., &c.

trust (Pat. R., Deeds P.R.O.I.). 1642 Sir Hardress Waller was besieged for six weeks by Gen. P. Purcell, and surrendered for want of water. He describes the place as having a fair large stable, one story high, built of stone with fair timber-work; the repair of the C. and barbican cost £300. He gives a long and very interesting list of goods, furniture, stock, &c., including 20 musquets, fowling-pieces, callivers, and a harquebush (Dep., 287, 290). 1657 The D.S. gives a view of the C. (D.S., B., 17).¹ It was forfeited by Waller as one of the judges of Charles I., having signed his death-warrant. Granted to Sir H. Ingoldesbye, but remained still in possession of Waller's descendants. The modern house is on the C. site.

145. BALLYGLEAGHAN, Hollypark, in Curragh Chase north (20). Marked. Identified by the mearings given in the Civil Survey.² 1569 The C. of Pelleglohane surrendered to the English (C.S.P.I.). In that year Edm. f. David of Balligillighan was pardoned, and his fine remitted for good service under Sir Humphrey Gilbert (Fi. 1463, see Inq. Exch., 11). 1580 After the fall of Carrigfoile C., the followers of Desmond fell back before Pelham, burning Askeaton C. and Baile Ui Geileachain C.³ It was burned in April (A.F.M., Carew, ii., pp. 240-243). Carew calls it Ballogellohan C.; it was held by Ger. mac Thomas and Edm. mac David (Fi. 3767; Inq. Exch., 11). 1583 Ed. mac David mac Ruddy held, under the Knight of Glin, the C. and vill of Ballygollyghan, Ballygleaghan, or Ballygylyghan, in Kyllkurnan in Kenry (Des. R., 35B). Edward's son Thomas succeeded him in 1588 (Inq. Exch., 21, 25). 1591 Grant to Beston and Bostock as part of Seignior of Castletown (Fi. 5444). 1604 Tho. f. John Geraldine (Knight) of Glin held Bally Ilighane (Inq. Exch., 8). 1655 Gen. FitzGerald held Ballygleaghane (D.S.B., 17; C.S., xxvi., p. 20). 1668 Granted to Duke of York, 1703, sold to W. Taylor,⁴ of Burton and

¹ Plate XIII.

² As so many place-names have been altered in this parish, I may note others identified by C.S. Ballyhetrick is Crokers' Park; Ardroman covers Boherboy, Blossom Hill, and Stonehall; and Ballygleaghan is Curragh Chase, north.

³ O'Donovan is satisfied, "by Camden and Cox," that this is Ballyloghane in Ardagh (Index, A.F.M.); but Cox cites Camden, and has no independent authority; and Camden and Hollinshead are not borne out by C.S.P.I., Carew, or the Surveys. It is also inconceivable that the Irish returned to Ardagh after retreating, with the English in close pursuit, to Askeaton.

⁴ For this family and their connexion with the Berkeleys, see Journal R.S.A.I., vol. xxxiv., pp. 131, 132.

Ballinort, who settled it on his younger son Richard,¹ of Ballygleaghan or Hollypark.

Fabric.—The Down Survey and Trustee Map (17) show it as a strong peel tower in a square court, with turrets at each corner.² The 1703 Estate Book of Jas. II., p. 91, describes it as Ballyglahan, a very strong castle in good repair with a bawn of lime and stone about it, near 30 feet high, with four strong turrets, an orchard and a garden.

146. KILWIRRY C., unknown; but in Kenry, held with the last by Ed. mac David, 1583 (Des. R., 35).

147. DROMLOHAN (11). Not marked. Probably on Prospect Hill. 1583 Lystrumloghan C. in Kylkurnan (Peyton, p. 224; Des. R., 74B). 1657 Dromeloghane, Ger. FitzGerald (C.S., xxvi., p. 21). Granted to the Duke of York, and sold to W. Taylor, 1703.

148. BALLYNOWGOOLE C., in Kylcurnan. 1583 Knight of Glin (Des. R., 74B). Unknown.

149. GARRENBALLAGHONOO C., given with last (Des. R., 74B), perhaps Shanballymore, granted to Beston, 1590; held by J. FitzGerald. 1655 Granted to Duke of York, and sold (1703) to W. Taylor (Fi. 5444; C.S., xxvi., p. 20; O.S., 11).

150. BALLYCAHAN (11). Not marked. 1583 C. given (Des. R., 74B) and in Beston grant.

151. CASTLE BEHIZ. 1573–1583 Among Knight of Glin's lands, separately from Beagh (Carew, i., p. 435; Des. R., 74B).

152. CASTLE GREY (11). Not marked. Perhaps one of last, possibly Ballynikerrigly, "Townland of the Grey Rock," in Beston Grant.

153. DERREEN (11). Marked. Perhaps one of last-named sites. We find no records under the name.

Fabric.—A tower 50 feet by 20 feet; the sides down, but the ends remain (O.S.L., 9, p. 67).

154. CARRIGANEA, in Ballyshonickbane (11). Marked. 1578 C. held by Knight of Glin (Des. R., 74B; Peyton, 223). Grants to Drury and Beston; Cowleshonikyne,³ with Arloman (undated Inq. Exch., 54) as held by Tho. Came, a rebel. 1655 T. FitzGerald and N. Fanning

¹ Ballygleaghan was the name used down to the death of Ric. Taylor, 1733 (Prerogative Wills, Dublin).

² Plate XIII.

³ It is called "Cowleshonikyne" in Inq. Exch., 54. This prefix "Cul" is not uncommon, as *e.g.* Culballysiward for Ballysiward, and Cullkilltily for Kiltel (C.S., xxxi., p. 2).

held the lands (D.S.B., 17; C.S., xxvi., p. 18). Called Carraig an fhiagh in 1840.

Fabric.—It stands on a rocky knoll, about 30 feet high, in marshy ground. The unusual feature of a wide fosse occurs to the north, round the base of the rock. There are two buildings much defaced, a mere broken fragment, thickly ivied, remains of the peel tower; it is 18 feet high, and 16 feet wide.

155. ISLANDMORE, in Castletown (3). 1583 Yland or Illan-more-Ruddery C., Knight of Glin (Des. R., 74B). 1655 A ruinous C., of Sir H. Waller, meared on east with Ballymartin, and with Kilcornan on west (C.S., xxvi., p. 16). 1703 The part of Castletown called the Island, property of King James. It is the eastern part of Castletown.

156. MORNANE (11). Not marked. 1583 C. of Mournan in Kilcurnan, Knight of Glin (Des. R., 74B; Peyton, 222B). 1655 Held by T. Fitzgerald (C.S., xxvi., p. 22).

157. CURRAGH (11). Not marked. It gave its name to the division Kenry hurragh, 1583, Teige ne Donnogho mac Teige ne Currough,¹ of the C. of Hurrough (Des. R., 36B; Peyton, 224B). 1655 Edm. Purcell held Curry, sold to H. Widenham. 1666 To Duke of York. 1703 To John Hunt,² of Glangoole, County Tipperary. It probably stood at Curragh Chase House.

ADARE (part).

158. TOUGH (21). Not marked. 1583 Tohoride C. held by Teige ne Dermodo ne Tohogh in Kylcurnan (Des. R., 36B). Probably named after the O'Reidy family.

CHAPEL RUSSELL.

159. SHANPALLAS OF KENRY (12). Marked. O'Donovan regards this as the C. of Caenraige of the Annalists. If so, and Castletown

¹ It has been supposed to have given its name to Bishop Peter de Curragh (miscalled Creagh); but he took his name from the Curragh of Kildare, where he succeeded to land from his brother Godfrey de Curragh (Mem. R., xix., xx., Ric. II., No. 58. This gives a pedigree of the Curragh family). In 1401 Matilda de Curragh was found to be the Bishop's heir.

² The Hunt family was founded in Limerick by Vere Hunt, 1660, son of Capt. J. Hunt, of Talbotstown, Wicklow (one of the '49 officers), probably son of H. Hunt, of Gosfield, Essex, High Sheriff of that Shire. From them sprang the Hunts of Lickadoon, Friarstown, and the De Veres, baronets of Curragh. See under these place-names.

be not intended—1573 Gerald, Earl of Desmond, on his removal from the Tower of London to Dublin, escaped on St. Patrick's Day, and in three days reached his own lands, expelled the English from the C. of Caenraige, and next year made terms with the Government and surrendered the C. (A.F.M.). 1583 Gerald mac Thomas held the C. of Pallace in Kenryherrowe (Des. R., 33B). 1638 Garrett Fitzgerald held it at his death from G., Earl of Kildare, as part of Adare Manor. 1650 Sir H. Waller took and dismantled Pallas C. It was eventually granted to the Duke of York. "Castlepallace, *alias* Knocktershane, or Shanpalse (Trustee Maps, 6, 38). 1703 Sold to John Bury, ancestor of the Lords Charleville."

Fabric.—A lofty tower on a rock, 20 feet high. Tradition connects it with the Earls of Desmond. The south wall, and about half of the sides, have fallen; the rest is fairly perfect, 16½ feet by 14 feet inside; the walls 6 feet thick and 60 feet high. It has five stories; the two lowest are under a vault. Near it is a "Court," the walls 30 feet high and 5½ feet thick. Near the main tower is a round turret, with spiral stairs, leading to a sallyport near a pool. The outer wall encloses a bawn about 60 yards square (O.S.L., 8, p. 7).

KILDIMO.

160. BALLYCULHANE (12). Marked. 1299 Sir Hugh Purcell¹ held Moyero (Croagh), Ballycathelan and Clanech (Justic. R., Cal., p. 246). 1518 Gerald, Earl of Kildare, held Ballycathelan in Kyenry, Co. Lim., and the advowson of the free chapel of Russell (Rental). 1581 Pelham reported that Brian Duff O'Brien, of Carrigogunnell, got aid from Adare in Feb., 1581, and raided Kenry, taking 200 cows; Desmond and his men pursued, but could not recover the cattle, and lost, "a son of old John of Desmond" (Carew ii., p. 225). The Garrison of Adare sent soldiers to raid Kenry; but they were defeated and nearly exterminated by David oge Purcell, of Baile ui Chathlain, near his C. The Captain of Adare got aid from Kilmallock, and stormed Baile ui Chathlain C., slaying 150 women and children (A.F.M.). 1583 Peirce Purcell held Ballycullen C. in Kyldyma

¹ Hugh Purcell appears in the Black Book of Limerick as granting wood and turf, at Moychro, to the Bishop of Limerick. The Purcells appear in the Plea Rolls from 1318. The charter of Hugh to his son Robert Purcell, as to Ballycathlan, is cited; the place was entailed on the younger sons, Walter, Thomas, and Philip (No. 116, m. 42). There is also a suit (m. 47) of T. Purcell against Maurice, Prior of St. Mary's, Rathgell, for wrong done at Moychro.

(Des. R., 33B). 1612 Edm. Purcell, of Croagh, was granted Ballycalhane C. (Pat. R.). 1640 Held by Gen. Patrick Purcell, as heir of his son James, under the Earl of Kildare, as part of Kildare Manor (Inq. Chan., 8, 241). 1657 The C. bawn, three great houses, a mill seat and weirs, late of Major P. Purcell, deceased (C.S., xxvi., p. 7; D.S.B., 16; B.D., 26).

Fabric.—The Down Survey and Trustee Map (35) show it as a large court with towers at the angles, a house inside, and a neat garden surrounded by rows of trees.¹ There is a view in the "Limerick Field Club Journal," vol. i. The C. consists of a court 195 feet across, the walls being 30 feet high. It had towers at the angles, and an oblong "Castle" stood detached to the north. The fosse could be flooded from the Maigue. The "Estate Book" of 1703 describes it as a large castle, strong walled, with a good garden and orchard, and a stable.

161. ARDLAHAN (4-12). Not marked. The name is a warning to those who would arrive at old names through modern forms. 1583 Garrett MacGibbon held Ederreirelohan in Kyldima (Des. R., 34). Ederrelohan C., held by T. mac Ruddery, Knight of Glan (Peyton, 227B). 1619 Walter Coppinger surrendered the C. of Eleur Ieolaghan (Pat. R.). 1657 Ardloghan or Ardlaghan, Sheehy Purcell (C.S., xxvi., p. 8). The place lies at the head of "Bleach Lough," and probably covered Kilmacat "between the two lakes"—of Dromore and Bleach Lough—as the older name implies.

162. COURT (12). Marked. 1583 Garrett mac Gibbon mac Reynode held Court mac Reynode (Des. R., 34). The name may imply that the C. was built by Gibbon. (See also Peyton, 217B.) 1655 It was held by Gerott mac Tibbott and others (C.S., xxvi., p. 10). 1702 H. Widenham held it.

Fabric.—A low, well-preserved peel tower, with slight projecting turrets to the east and west, between which the southern face is curved. In the north-east angle is a ruined staircase. The north wall has a batter to each side of the plain-pointed door. The windows are rude and plain; and the lower story vaulted.

163. BOLANE (12). Marked. 1583 W. Shanc, mac Ric. mac W., held Beolane C. in Ardehanhe (Des. R., 33B). 1591 Grant to W. Carter. 1624 To Sir W. Parsons (Pat. R.). 1625 Edm. FitzGerald died seised of it; his son William succeeded (Inq. Chan., 10), and held the C. in 1655 (C.S., p. 13).

¹ Plate XIII.

Fabric.—A tall peel tower, one side in good preservation for its full height; the opposite side with the doorway, having a staircase to the left, is levelled. It has two vaults and an upper room; the masonry and features are good, of well-cut limestone, and date from the later fifteenth century. The usual ambreys and angle-slits occur; also a slight turret at the battlement. It stands on a low rock overlooking the Maigue valley and northward into Clare. It is traditionally a FitzGerald tower.

164. CULLAM (12). Marked. 1201 Kildacolum held by Limerick Cathedral (B.B.L., p. 14). 1651 It was defended by Capt. Thady Burke, who surrendered to Sir H. Waller after a few shots had been fired with sakers. Some men on the tower, being unaware of the capitulation, fired, killed two of the English, and wounded Waller, who, convinced of the mistake, insisted that his men should spare the Irish. 1655 Healy held Killacollum ruinous C. (C.S., p. 11; D.S.B., 16).¹

Fabric.—The northern wall stands near the Maigue; but all its features are defaced. The lower story was vaulted. It had a bawn.

ARDCANNY.

165. RINEKIRKY in MELLON (4). Not marked. 1569 Rynekirkey C. in Kenry surrendered to the English (C.S.P.I.). 1583 The Knight of Glan, Roynkyrkey in Ardecanghe (Des. R., 74B; Peyton, 215; Hardiman Map, 1590, No. 63). 1637 Reinkirky and Mollane held by Garrett FitzGerald (Inq. Chan., 227, 249); Mullane with a good house and six small cottages, Gerrott oge and Morrish FitzGerald (C.S., pp. 6, 7). 1703 Sold to Phineas Bury, who granted it to T. Westropp, of Ballysteen, who in 1744-5 left it to his second son Mountiford, whose descendants hold it. It is at the mouth of the Maigue.

COSHMAGH.

This long and straggling barony is practically the valley of the Maigue, as its name implies. The name "Foot of the Plain," or "Bank of the Maigue,"² is evidently purposely contrasted with the

¹ Plate XIII.

² "Magh" is perhaps the plain rather than the Maigue, as we find the compound in the river Commogue, and also used for the Abbey "de Magio," two miles from the Maigue.

adjoining barony "Coshlea," "Foot of the Hills." It mainly coincides with the ancient *Ui Cairbre Aobhdha*, and contains Bruree, the oldest "royal centre" of the Dalcassians. O'Huidhrin, about 1420, thus alludes to it:—

"Hereditary to O'Donovan of Dun Cuirc
Is this country as a land of entrenchment :
He owned without tribute the lands
Along the slow-flowing Maigue,
And the plains down to the Shannon."

In Norman times it included the cantred of Adare (or Cromoth), Ocarbry, Ioregar, and Fontemel. The present name seems to have got established in the two centuries between 1377 and 1586; but we fail to find its early usage. The portion at Monasteranenagh was known as Kenelmekin in 1186. In 1655 a large union of parishes named Ballingaddy covered all Coshmagh from Drehidarsna to Tankards-town, except Effin and Hackmys, which then belonged to Coshlea.

166. ADARE (21). "Desmond Castle." Marked. In 1226 G. de Marisco was granted the manor and fairs. Agnes de Valence enfeoffed J. de Verdon, who was confirmed in the manors of Crommeth, Adar, Castro Roberti, Atletageth, Grene, or Estgrene, and Wrigedy by Hen. III. and Prince Edward, 1266. This group often recurs.¹ 1302 Held by T. f. Thomas, and 1317 by the Earl of Kildare. His son Richard had livery, 1328. In 1331 is named the "C. in which there is a hall; a C. with stone walls, covered with thatch; a tower, covered with planks; a kitchen, covered with slates, and a chamber near the stone part covered with thatch," the manor being "waste from the war." 1334 J. Darcy got a grant for repairing C. 1478 T. Earl of Kildare died there. 1536 Forfeited on the attainder of Silken Thomas. 1541 It was granted with Crome to James, son of Sir John, Earl of Desmond. 1559 Described as "an old broken C." 1570 Leverous, Dean of St. Patrick's, found refuge here. 1578 Taken after a siege of eleven days; Stanley, with Peter and Geo. Carew, repelled all attempts of John of Desmond to retake it. 1579 Lord Ormond held it. 1582 Taken by the Irish; recovered by Zouche and Dowdall. 1599 Essex seems to have neglected it, and garrisoned

¹ See Hist. MSS. Com. App. Ninth Report, Dep. Keeper Records (MSS. of Duke of Leinster). Grant of Ed. I. to J. fitz Thomas, p. 266A, and other deeds, pp. 266B, 267B, 268, with the manors of Carnekittel (extant in 1331), Corkmoyght, and Tbornea, and also Ballycathelan in Kyenry.

the abbey at the opposite end of the bridge on his way to relieve Fra. Berkeley, then besieged in Askeaton. 1600 The C. was ruined by Piers Lacy; it was held for the Sugaun Earl, retaken by Carew, and vainly blockaded by the Irish. In 1641 it was garrisoned by the Confederates and taken by Lord Castlehaven. 1653 A garrison was kept there; it was eventually dismantled. 1657 Athdare Manor, C., bawn, castle-ploughland, and bridge owned by G., Earl of Kildare. 1684 Leased by the Earl to Thady Quin¹ with the "old bawn." 1711 Purchased by Quin (under an Act of Parliament for the sale of Kildare's lands); his descendants, the Earls of Dunraven, still hold it. (See C.S.P.I.; B.B.L.; Carew MSS.; Rolls; Accounts; Civil Survey, xxiv., p. 32; Down Survey, A, 49; Memorials of Adare, &c.)

Fabric.—The Desmonds' Castle, as it is inappropriately called, consists of a keep, girt by an inner and an outer court, each protected by a fosse, and the outer washed by the Maigue to the south. The inner court (no less by its plan than by the objects found in it) was an early ring-fort. The keep is about 40 feet square, with slight projections at the angles; the north wall is entire. The inner court is complete, with battlemented walls and a strong gate-house for a drawbridge; the garth is about 110 feet across. The outer court has walls with a round tower to the north-west, and a garderobe tower on the river to the south-west; between them is a large gateway. Along the river runs a range of buildings of various ages, from the early thirteenth to the fifteenth century. A strong gateway looks to the north, where lay the church and old town of Adare. The whole building covers about 300 feet east and west by 200 feet north and south.² (See "Memorials of Adare," well illustrated, and a valuable paper by the late Mr. G. Hewson in the "Limerick Field Club Journal," vol. i.)

167. FANNINGSTOWN (21). Marked. Not to be confused with Fanningstown in Fedamore (*infra*, No. 203). It may be the Ballyatheney or Ballyatneny (*i.e.* Bally-anhiny) held with Adare in 1285 by Maur., father of Ger. f. Maur. (C.S.P.I.). 1567 Tithes of Ballyfenninge granted to Sir Warham St. Leger (Fi. 1143), and in 1592 granted to Sir H. Wallop (Fi. 5964). 1655 Fanningstown C. and bawne held by Edm. Fanning³ (C.S., xxiv., p. 34).

¹ Thady Quin, in an extant paper, describes himself as born 1645, son of Donogh Quin, grandson of Donogh, son of James Quin, of Kilmallock, and nephew of Dr. John Coyn or Quin, Bishop of Limerick, who resigned 1551.

² View, Plate XIV. Plan, Plate XV.

³ The Fannings appear as living in Limerick County from 1297, when H. Fanyu

Fabric.—The peel tower is fairly perfect, but embodied in modern buildings.

168. BOULABALLY (21). Not marked. 1591 Ger. f. Morris FitzGerald alienated Bollybally C. to Jas. Leo. It was redeemed by his grandson, Thomas FitzGerald, in 1601. Maur. FitzGerald, of Thomastown, held Buolibally in 1636 with Cahirassa (Inq. Chan., 184). 1655 Ballybolly in Crome, ruinous C. and bawn; a part of Adare Burgess Lands (C.S., xxiv., p. 38).

169. CASTLEROBERT (21). Not marked. A manor, often named with Adare, from 1290 onwards. Its survey in 1331 is copied into the "Red Book" of the Earl of Kildare. 1559 The minister of Trynety Abbey had in Castle Robert a C. "which was lawles lands." 1595 The ruinous C. granted to Wallop. 1617 It was held as a possession of the Trinitarian or White Abbey, with salmon and eel weirs, by Sir J. Jephson (Inq. Chan., 5). 1638 C. and land of Robertstown or Castle Robert granted to N. Lylles¹; he died before 1657. (See C.S., xxiv., p. 40.) 1666 Confirmed to Sir E. Ormsby, 1669, and to Geo. Evans, of Ballyphilip, County Cork, in 1669 (Act Sett.). The church and C. were demolished for material for the bridge.

170. ROWER (21). Not marked. 1567 The tithes of Roer were granted to Warham St. Leger, and in 1595 to Sir H. Wallop (Fi. 1143, 4757, 5964). 1599 Scene of an ambushade and a fierce attack on the advanced guard of Essex by Desmond's soldiers (A.F.M.; C.S.P.I.). 1657 Rewrmore C., N. Lillies (D.S.A., 49; C.S., xxiv., p. 41). 1669 C. granted to G. Evans (Act Sett.).

KILLONAGHAN (part).

171. GARRANROE (21). Not marked. 1655 Garran Roo, ruinous C. in Crome, late Major-Gen. P. Purcell (C.S., xxiv., p. 30).

CROOM.

172. DUNKIP (31). Not marked. 1291 Dunkepchy (Papal Tax). It has been supposed to be Dunaiched fort 1002, 1090, but there is

and H. Fox appear in Pleas of Record (Justic. R. Cal., p. 104), and in the city, from 1459, when Ric. Fanning was bailiff. From 1511 the name is of frequent occurrence on the lists of mayors and bailiffs. Clement of Fanningstown had a son Clement, Mayor of Limerick. A funeral entry of his son Simon, 1636, is extant (Ulster's Office, Book vii). He married Joane Arthur, and had four children.

¹ The Lilis family was settled in Limerick before 1503, when John Lilis was elected bailiff.

no identification apparent from these entries. 1576 Walter Leo held Donkipp (Fi. 2784). 1582 He held the ruinous C., garden, croft, and water-mill (Des. R., 71). 1587 Granted to E. Mainwaring (Pat. R.; Inq. Exch., 25; Peyton, p. 233b). 1611 It had been granted by Elizabeth to Rob. Cullome, who sold it to E. Browne (Inq. Chan., 6B). 1619 Granted to D., Earl of Thomond (Pat. R., xxvi.). 1641 Ric. Harte held it (Dep., 155), and James Bourke, 1655 (C.S., xxiv., p. 27; D.S.A., 49). 1667 Confirmed to Col. H. St. Leger (Act Sett.).

173. CROOM (30). Marked. 1144 Cromadh, burned by 'Turlough O'Conor (A.F.M.). 1215 Crumeth C. granted to Maur. Fitz Gerald of Offally (C.S.P.I.). 1293 His dau. Juliana de Cogan held it for a sparrow-hawk and three pence (Red Book of Kildare). 1295 It is alleged that the burgesses of Cromyt paid 10s. to the sheriff Rog. de Lesse that their corn should not be taken for the King's use (Justic. R. Cal., p. 52). 1310 The Earl of Kildare licensed to wall the town of Cromoth. 1323 Held by Basilia Thursteyn (Plea R.). 1334 C. repaired by J. Darcy (Pat. R.). It remained a chief C. of the Earls of Kildare, who took from it their war-cry, "Crom aboo!" 1524 Gerald, Earl of Kildare, gave a sorell horse to Phil. mac David, constable of Croom (App. 9 Rep. D.K.R., p. 281). Confiscated from Silken Thomas, and granted, 1547, to Earl of Desmond (Pat. R.). 1600 Held by Pierce Lacey, who fled on the approach of Carew (Pac. Hib. I., p. 108). 1610 Restored to Earl of Kildare. 1641 Edm. Perry¹ besieged there by W. Leo of Tullyvin (Deps. 374, 383). 1657 A Manor, C., bawne, orchard, mill, two eel-weirs, and a broken bridge (C.S., xxiv., p. 23). 1721 Purchased by J. Croker,² of Ballinagarde.

Fabric.—Part of a peel tower remains near the modern house. (See "Round about County Limerick," Rev. Jas. Dowd, p. 131.)

174. CASTLEKIPPEN. UNKNOWN, probably at Croom. 1597 Castlekippen, in Crome, late estate of Maur. (Mac Ric.) O'Riordan, attainted, granted to G. Sherlock (Fi. 6175). 1604 The C. of Castlekippen, in the towne of Crome as above, granted to R. Leycester

¹ Edmond was nephew of W. Pery, buried in St. Mary's, Limerick, Oct., 1633, the son of W. Pery, of Exeter (Funeral Entry, Book VI., Ulster's Office, Dublin), and was ancestor of the Viscounts Limerick. His wife was daughter of Edm. Sexten, of St. Mary's Abbey, Limerick, and heiress to her nephew, who died, 1671.

² Edward Croker, of Raleighstown, Limerick (slain in the rising of 1641), is believed to have been the third son of T. Croker, of Trevillas, Cornwall. His son, John, married an heiress of Sir T. Browne, whose grandson, John, settled at Ballinagarde.

(Pat. R.). 1653 Col. W. Piggott,¹ Castlekeepine and Gortmore Coshmagh (Hartwell's Account), not named in Civil Survey.

175. DUNNAMAN or TROSTANY (30). Marked. 1297 Geff. f. Ric. held Villa Yursteyn (Justiciary R. Cal., p. 98). 1298 Drastenagh, held by J. Maunsell (Plea R.). 1418 Villa Trostany (Tax. Proc.), Rustainy or Dunnemeaunn (Torn Roll, White MS.), named from the Thursteyn family (see under Croom, 1323); Lady Dunraven asserts that it is the C. of Dunnambeann, in Cairbre, named as built in 1506 (A.F.M.), where O'Donovan, with more probability, identifies this with Dunmanway, in Carbury (Mem. Adare, p. 198). 1571 Pardon to W. Lacye, of Thurstanstown, Co. Lim. (Fi. 1694). 1587 Ballyrustan, or Downemeane and Uregare, granted to G. Thornton (Carew i., p. 449; Fi. 5052); he died 1605. A later G. Thornton held it, 1655 (C.S., xxiv., p. 42; D.S.A., 49; B.D., p. 73). 1666 Confirmed to E. Ormsby.

Fabric.—A low peel tower, probably later than 1500. It is 46 feet by 33 feet, and 31 feet high; the walls 8 feet thick, with the usual guard-room, porch, "murder-hole," and stairs. Figure of a sheelanagig (Description, plans, and views, "Memorials of Adare," p. 198).

176. CAHERASS (21). Not marked. 1150 Eass Maige Fort (Book of Leinster) as being on the rapids of the Maigne. 1251 Cathyrass, held by J. Flandrens (B.B.L., xlvii. and lxi.). It belonged to the Earls of Kildare. 1599 Ger. FitzGerald died, seised of Caherass C. (Inq. Chan., 9, 61). 1636 Mau. FitzGerald held Cahirassa C. and vill., in the Manor of Croom, from the Earl of Kildare (*Ib.*, 184). 1657 C., bawn, orchard, and eel-weir on the Maigne, late held by Garret FitzGerald (C.S., xxiv., p. 31; D.S.A., 42). 1666 Granted to Sir Edm. Ormsby. 1703 To Geo. Evans, jun. Now held by Sir David Roche, Bart.

177. TOOREEN or ISLANDMORE (30). Not marked. 1641 Edm. Hickie, of Tourine, and W. Leo, of Tullyvin, hanged some of the inmates of Croom C. (Dep., 383). 1655 Tworin, in Croom, stump of a C., Edm. Hickie (C.S., xxiv., p. 30). There was some tradition of a C. there down to 1874.

¹ Sir Robert Piggott, of Dysert, Queen's County (son of John, who was granted that place, 1562), had a fourth son, William Piggott, who married Anne, daughter of Sir J. Dowdall and his wife Elizabeth, daughter of Sir T. Southwell, of Castle-matress. Anne defended Kilfenny (*vide infra*) against the Confederates, 1642, which place was held by their greatgrandson, who died, s. p., in 1718.

178. PULLAGH (30). Not marked. 1657 "C. on Polagh" (D.S.A., 42). No other mention, a doubtful site.

179. TULLOVIN (31). Marked. 1586 Tuloven C., in Cosmave (C.S.P.I., p. 238). 1587 Pardon of Ric. Leas of Toolaobhin. 1600 Pardon of Edm. Leos, of Tullevine, and J. Leos, of Dollagh (Fi. 5006 and 6452). 1606 The same Edm. died, succeeded in C. by his son Jas., aged 30, in 1636 (Inq. Chan., 161). 1621 Sir W. Parsons was granted Tullavin C., late estate of Jas. Leo (Pat.). 1637 E. Leo held Tullaghfin (Inq. Chan., 190). 1655 Tullovyne C., bawn, stone-house, orchard, and two mills, late estate of Jas. Leo (C.S., xxiv., p. 29; B.D., p. 72). 1666 Granted to Cha. Ormsby (Act Sett.).

Fabric.—A typical peel tower, with the usual window-slits, probably of late fifteenth century. Carving of a sheelanagig on the outer wall.

ATHLACCA.

180. TULLERBOY OF CASTLE IVERS (31). Not marked; but traditionally at the present house. 1319–20 Tylahorwy, Co. Lym., held by Jo. de Kerredyn; the King granted it to W., Bishop of Ossory, and his heirs for ever (Writ, Pipe R., No. 43). 1583 Edm. Leo held Tollereboye and Ross Temple; W. Ryurdane had held the C., when he was slain in Desmond's rebellion (Inq. Exch., Jas. I., No. 8; Des. R., 39 b; C.S.P.I.). 1655 Walter and Morras Lee held the C. and bawn (C.S., xxiv., p. 10; D.S.A., 49; B.D., 72).

181. ATHLACCA (39). Not marked. 1285 Athleketh, a manor of Maur. FitzGerald, frequently appears with Adare, as a manor of the Earls of Kildare. 1318 J. Gower held it. There is little independent mention of it. 1655 David Lacy held Aghleakagh C., mill, and orchard (C.S., xxiv., p. 9; D.S.A., 42). 1666 Granted to C. Ormsby (Act Sett.). The C. was standing in 1827 (FitzGerald, i., p. 323), destroyed before 1840.

182 BALLINCURRAGH (31). Not marked. 1655 Ballycoragh C. in Athlacca (D.S.A., 45); no other mention. Doubtful site.

183. RATHCANNON (39). Marked. A manor of the Earl of Kildare; after the attainder of Silken Thomas, the Manors of Adare, Crome, Rachanan, and Tobernea were in the King's hands, 1540 (C.S.P.I., p. 254). 1583 J. and Moriart Buy mac Kynery had been slain at Rachanyn, in rebellion of Gerald, Earl of Desmond (Inq. Exch., 38). 1622 Jas. Casey settled his C. of Rathcannon (Inq. Exch., 198). 1624 Sir W. Parson held C., late estate of J. Casey (Inq. Chan., 44, 190). Sir Drury Wray, by his marriage with the eldest dau. of

T. Casey (who died 1637), and his wife, Bridget, dau. of Sir J. Dowdall, of Kilfenny, succeeded to Rathcannon¹ (see Trustee Map, 16).

Fabric.—The C. is on a bold, rocky ridge, and consists of a walled court, with a square tower to the north-west, and a residence to the west. The tower is broken; the north wall, 33½ feet long, and parts of the sides remain; it is 30 feet high, with walls 4½ feet thick. The east face of the court is 105 feet long, the north 120 feet. At the north-east angle are two flights of steps to the top of the wall; no ornamental features remain (O.S.L., 9, p. 371).

TULLABRACKY.

184. TULLABRACKY (31). Site marked. 1185 Tullabracci granted to Abbey of Magio (charter). 1302 The corn seized for the King, given to W. le White of Tylaghbrek and others (Justic. R. Cal., p. 466). 1308 Tullachbrek Manor, on the death of Bishop Robert Dundonyll, was taken into the King's hands (Pipe R.). 1655 Tullabreacoke or Tullabracky (C.S., xxiv., p. 14).

Fabric.—It was nearly levelled in 1810 by J. Molony; parts remain embedded in the stables of the modern house.

BRUREE (part).

185. HOWARDSTOWN OF BALLYSIWARD (39). Not marked. At an early period, after 1200, Hamo de Valoignes, Lord of Iniskefty, had enfeoffed the Archbishops of Dublin in Culballysyward,² in perpetual alms (Plea R.); Alex. de Anud granted to Archbishop J. de Saunford the homage of his nephew, John, on the same (Antiquissimus Roll, P.R.O.I., 1285; and Liber Niger Alani, No. 1061). It then was granted to the Dondon family, who held it from at least 1284 to 1655.

¹ The Wrays, a Durham family, got lands in Yorkshire. Sir Chris. was Lord Chief Justice of Queen's Bench. 1573 His son, W. Wray, married a daughter of the Lord Deputy, Sir W. Drury, and was created a baronet 1612: their son, Sir Christopher, had a third son, Sir Drury (6th Baronet), born in Lincolnshire, 1633, and married Anne Casey, of Rathcannon. He died 1710: his son, Sir Christopher, died ten days later, succeeded by his brother, Sir Cecil Wray. Sir Drury was a captain in the army of King James, and was attainted; but his son stood high in favour of King William, for whom he fought in Flanders, Spain, and Portugal, and so protected his family (see Complete Baronetage, G.E.C., vol. i., p. 95):

² Culballysyward and Ballysyward are used as practical equivalents: see, *et c.*, title case, 1295, of T. de Cocis, Dean of Limerick, and the Sheriff Roger de Lesse (Justic. R. Cal., p. 38).

In 1284, Maur. FitzGerald unjustly disseised J. Dondon, of Culballysyward in Ocarbry (Plea R., 14). 1289 Suit of J. Dondon and Adam Le Hunt about same (*Ib.*, m. 16). 1295 For John, son of Hugh Dondon, see Justic. R. Cal., pp. 40, 68. 1308 Peter Daundonnd held part under Archbishop (Pipe R.). 1317 N. de Lees held part with Kilmor, near Garth (Mem. R.). 1318 Lees' lands held by Crown (Plea R., 119, m. 31). 1318 Jo. f. Peter Daundoun broke into and robbed Balysiwad Church (Plea R., 124, m. 43). 1319 The King put W. de Hampton in charge of lands of late Peter Daundon under see of Dublin (Grossi Fines). 1322 Suit of N. and Juliana de Lees with J. Goer about lands at same (*Ib.*). 1410 Ballisheward, or Ballyhaward, named in "Torn Rolls" (White MS., Len.). 1583 C. held by G., Earl of Desmond (Inq. Ex., Jas. I., No. 8). 1587 Sir E. Fitton was granted the head-rent of Ric. Dondon, in Ballyhyward (Fi. 5032). 1597 The Chapter of Limerick granted the Dean's C. at Ballihaward to Jas. Cromwell (Inq. Exch., 19B). 1600 Pardons of Ric. and Peter Dondon, of Ballyhyward (Fi. 6446). Grant of the head-rent being £4 in "haulface money," *i.e.*, £5 6s. 8d. sterling, to N. Haward (Pat. R.). 1653 Lease of C., bawne, and mill of Hywardstown to Cornet J. Tilly (Hartwell Account). 1655 Ric. and Mary Dondon lately held the decayed C. (C.S., xxx., i., p. 28).

BRUFF.

186 BRUFF (32). C. and "Court" marked. 1420 Brugh na nDeisi (O'Huidhrin). The C. is said to have been built in 1220 by de Lacy. It was an appanage of the Hospital of Aney. 1583 Near Awney C. "is the place where Burg, *alias* A Burrough town, was formerly, which was altogether laid waste, long before the rebellion of the Earl (of Desmond), except a house or peel tower of Maughan mac Teige" (Des. R., 4b). Piers Lacy, of Broffe, was in Desmond's rebellion (Fi. 4369). 1600 He held the C., was defeated by Capt. Slingsby, and Brough C. garrisoned. Carew describes Lacy and the Knight of Glin as "children of perdition, not to be admitted to terms." Lacy was executed, 1617, and his lands given to Sir T. Standish (Inq. Exch., 1; Pacat. Hib., I., p. 55; C.S.P.I.). 1641 J. Lacy, of Bruff, "a person of eminent power," took the C. from E. Standish,¹ and from it harassed the English at Lough Gur.

¹The monument to Sir T. Standish, put up by his grandson Standish Hartstonge, Recorder of Limerick, 1675, remains in Bruff Church. The latter was son of Francis Hartstonge, of Southreps, Norfolk.

A rumour spread that the latter intended to burn Bruff; and this, with the fact of their burning Ballynegalliagh village, led Lacy to advance against them. He drew up his men on the hill; but the English did not venture to attack him, and he returned to Bruff. Unfortunately, while he was absent from home (against his explicit orders and his wife's entreaties), his followers hanged two English prisoners, in revenge for Ballynegalliagh (Deps., 359, 371, 457). 1655 Broffe C., bawn, orchard, and tucking-mill belonged to the daughters of Sir T. Standish (C.S., xxiv., p. 11). It was the chief residence of the Hartstonges, Baronets, in later days.

Fabric.—The C. was on the "Morning Star" river to the west of the bridge. It measured 35 feet by $18\frac{1}{2}$ feet, and had a square door with inclined jambs. It was 24 feet high, with a vaulted understory, the rest nearly gone. The defaced "Court" lay to the north-east, and was 27 feet long; both have been levelled since 1840 (O.S.L., 8, p. 102).

DROMIN.

187. MAIDSTOWN OF BALLYVENOGE (39). Marked. 1655 Ballybenoge or Ballyvenoge C., a good C. and bawn, and an indifferent house, John Fox (C.S., xxiv., p. 4; B.D., p. 68; D.S.A., 42). 1666 Confirmed to Captain A. Ormsby; then passed to the Gubbins family. It was locally called Baile ui Benóg in 1840.

Fabric.—It measures 35 feet by 32 feet externally, the walls being $3\frac{1}{2}$ feet thick, and 50 feet high. The main wing has three, the turret five, stories, with a spiral stair in the latter (O.S.L., 8, p. 81).

UREGARE.

188. BALLYGRENNANE (40). Marked. 1583 Part of the C. of Ballegrynan was held by W. ffuxe; it lay in Pubblebuskagh (Inq. Exch., 14; Peyton, p. 206). Gerald, Earl of Kildare, and his ancestors had held it (Inq. Exch., 13). Jas. Fox held Castellynam, Ballygrynan C., and other lands (Des. R., 3 B). 1621 It was granted to Dr. J. Metcalf and G. Jones (Pat. R.). 1657 Jas. Fox held Ballygrenan C., orchard, and fishing-weir out of repair. It was sold to G. Evans² (C.S., xxiv., p. 20; D.S.A., 42; B.D., p. 71). Confirmed to Evans, 1667.

¹ FitzGerald (vol. i., p. 320) mentions the very handsome house built by the Hartstonge family on the site of the Lacy's Castle, near Bruff, on the bank of the River "Dawn."

² John Evans, father of this George, settled in Limerick, 1628. George had a son

Fabric.—It is a late sixteenth-century house. The main wing is 16 feet by 25½ feet inside, with a circular staircase turret to the south-west and small apartments to the north. The second floor is broken, the third vaulted, the next broken. The stairs are gone above the second floor. The windows are rectangular and mullioned; the walls 3 feet thick, 50 feet high and embattled; extensive outbuildings and a court with an outer gate remain. The main wing has bartizans at the opposite angles; and, like the other buildings, has tall chimneys (O.S.L., 8, p. 105). There is a view in “Limerick Field Journal,” vol. i. Fitzgerald, in 1827, describes it as “a very fine and noble building, surrounded with ramparts” (vol. iii, p. 322).¹

HAKMYS.

189. CREGGANE OR HAKMYS (47). Marked. 1297 and 1309 Phil de Prendergast had a suit with H. de Capella about Acmys or Akynnys (Plea. R.). 1583 Castle Creggan, in Cosmaye or Craigin (Des. R., 68; Inq. Exch., Jac. I., No. 17). 1657 Cragan C. is shown as a turreted peel tower, and a bawn (D.S.A., 46). Craggan and Ballyngaule, or Glinhare, on border of Cork, a C. and bawn out of repair, J. Supple (C.S., xxiv., p. 14).

Fabric.—It had recently been lowered and roofed in 1840. It was 34 feet by 26 feet outside; walls, 5 feet thick, with three stories, the lowest vaulted (O.S.L., 8, p. 86).

190. BALLINCOLLY (47). Not marked. 1583 ffoxes land, Ballin-Cowly-Rwo, *alias* Ballincollin (Des. R., 3). Ballyncollyroo C. in Knockesawno (Peyton, p. 13). 1590 Phil. Nash held C. (Inq. Exch., 54). 1655 Lord Broghill held Ballincolloruo in Effin; sold to Earl of Orrery (B.D., p. 69; D.S.A., 42). 1666 Confirmed to Capt. A. Ormsby (Act Sett.).

TANKARDSTOWN.

191. TANKARDSTOWN, NORTH (47). Site marked. 1280 Anne, widow of J. de Cogan, claimed dower off Tancardstown from J. de Penrys (Mem. R.). 1291 Balliitankard held by de Lees, de Goulys, and, in 1320, by the Russells, a suit arising as to whether J. de Cogan had unjustly disseised John, grandfather of Tho. Russell, of it (Plea R.). There was a Tancardus Russell, of Kilbreedy,

George, who, after 1691, settled at Bulgadin, and his son George, in 1715, was created Baron Carbery.

¹ Plate XIV.

1325 (*Ib.*). 1583 Jas. Fox held Ballytanckarde (Des. R., 33B). The C. is not given in the surveys of 1655. It was granted, 1666, to Capt. C. Ormsby. The site was called Caisléan Baile an Airighte, in 1840 (O.S.L., 8, p. 85).

192. KNOCKSOUNA (47). Not marked. The hill of Cnoc Samhna was the legendary scene of a battle of the High King Cormac mac Airt, in A.D. 241. "Eochy the red hand," King of Ulster, camped there in the time of St. Fionnchu of Brigown. The place is of little other note. 1583 T. Lacy held Cnoesawny (Fi. 2784). 1655 J. Gould held Knockesawny, with the stump of a C. (C.S., xxiv., p. 286), granted to C. Ormsby (Act Sett.). It is perhaps Tankardstown C.

193. BALLYGUBBA, SOUTH (47). Not marked. 1569 Garrett mac Thomas, of Balligibin, gave evidence as to John Desmond, and Doneskeagh C. (Carew i., p. 389). Pardon to same, 1572 (Fi. 2158). 1588 It and Cloghtacka C. granted to R. and Alex. Phitton, under name of "Phitton's Fortune" (Fi. 5175; Inq. Chan., 6B). 1608 Edm. mac Gibbon, the White Knight, died, seized of Ballygibbon C. (Inq. Chan., 17B). 1657 Held by N. de Lacy, *alias* Fitzgibbon, and sold to C. Ormsby (D.S.A., 42, 43; C.S., xxiv., p. 2; B.D., p. 67).

KILBREEDY, MINOR.

194. THOMASTOWN (47). Not marked. 1558 Ger. f. Tho., of Thomastown, was Sheriff of County Limerick (Fi. 42). 1599 Ger. f. Morris FitzGerald died seized of the C., mortgaged in 1591 to (David Miagh). Thomas his grandson redeemed it, 1601, with Bollybally and Tobornea (Inq. Chan., 9, 61). 1655 Gerrott FitzGerald, of Caherass, held it (C.S. xxiv., p. 3). It lay in the manor of Tobornea, 1721 (Mem. of Adare, p. 280).

195. LEAGANE OR TOBORNEA (47). Site marked. 1537 Jas. f. Desmond took the profits of the manor of "Tibernius," estate of late Tho., Earl of Kildare (Carew i., p. 132). 1629 W. Creagh, of Miltown, was appointed seneschal of Tuberneagh and other manors of G., Earl of Kildare, as formerly held by Peircy Smith (App. 9 Rep., p. 292). A heap of stones was called Tobornea C., 1840 (O.S.L., 8, p. 344). A doubtful site.

IN COUNTY CORK.

196. RATHGOGHAN (Cork 2 and 3). In 1583 this C. was included in County Limerick, and formed part of the estate of Gerald, Earl of Desmond (Inq. Exch., 10). Its relief by Lord Inchiquin and Col.

Jephson in 1642, and the effect on the blockade of Cork city, which was then beset by the Confederates, are well known.

SMALL COUNTY.

Tradition states that in the middle of the third century a branch of the Deisi settled in this district after their expulsion by Cormac mac Airt. From it was derived the name "Deisbéag," in contrast to the Decies in Waterford, hence the Norman "Desbeg," and the strange term "Small County," which dates at least from Tudor times. The barony contains the important early centres of Aine and Lough Gur. The former was the centre of a group of tribes, believed to be of Firbolg origin, and branches of the Martini of Emly, the Dilraighe, Margraighe, Sibenraighe, and Calraighe. Their territory met in the hill of the Banshee (possibly their goddess) Aine (Egerton MS., 92, f. 37B). It is probable that the river Commoge formed the ancient northern limit of Deisbeg, and the Saimer or Morning Star River the southern,¹ thus excluding the ragged fragments of Kilpeacon, Fedamore, and Croom, now in the barony, and including those of Bruff and Tullabracky. The portion between the Maigne and Commoge is probably the old tribal land. The great early "fair" of Enach-clochair, -beag or -cuilin, was held on the Commoge near Monasteranenagh Abbey.

KILPEACON.

197. KILPEACON (22). Not marked. It lay between the church and the modern house. 1300 Suit whether J. de Burgo disseised J. le Notour of the freehold of Kilpeghan (Justic. R. Cal., p. 341). The place does not appear as a parish till 1302. In an undated inquisition of about 1330, J. Lysnekylle held Kylpychan, then waste (B.L.L., 1); he also appears in Rupefort's Rental, 1336. The church is often mentioned during the next two centuries. 1592 Alderman Oliver Booreke, at his death, owned Kilpeacon (Inq. Exch., Jac. I., No. 24). 1652 Sir David Bourke was transplanted. The ruinous

¹ Even in 1655 (C.S., xxxi., p. 1) the rivers Camoge and "Cavoyer" are meares. The Saimer is named in the charter of Magio, 1186. For its English rendering, "Morning Star," see Dr Joyce's "Irish Names of Places," vol. i. (ed. 1893), p. 486. "Samhair" he equates with the ancient river-names Samara and Shamar. "Cavoyer" shows that the later "Camhair" has at least an antiquity of several centuries.

C. was sold to R. Swete (C.S., xxi., p. 21; D.S.A., 31, 36; B.D., 57). 1669 Granted to Sir W. King (Act Sett.). 1706 His son George succeeded, and the place eventually passed to his relative, Joseph Cripps, who took the name of Villiers. The C. and house, with a fine library, were burned, and the ruins demolished.

FEDAMORE.

198. FEDAMORE (22). Site marked in "Castlequarter." 1186 Ifedomair granted to Magio Abbey (Charter). It was a manor, 1237 (C.S.P.I.). 1317 W. de Camville held Fedmer; Geffry was his son and heir; he had a suit with Sir T. de Clare about the lands (Plea R., 119). 1347 Matilda de "Vernon," Isab. de Bermingham, and others got livery (Pipe R.). 1351 Ric. de Stafford married Marg. de "Verdon," heiress of Matilda, and held Fedemer (*Ibid.*). 1583 J. mac Dairegeloch had held the old C. of ffedamore (Des. R., 5B). 1588 This was granted to Edm. Manering (Inq. Exch., 25), and to Donat, Earl of Thomond, as Feadamore old C., late estate of Earl of Desmond (Pat. R.). 1657 Bart., Earl of Thomond, held it, the manor, Courts, &c. (C.S., xxxi., p. 18).

199. COALICK C. 1583 Named with the last (Des. R., 5B). 1586 Held by J. Morrice; it was in ffedamore, and is given with Fannings-town and Shanaclogh (Peyton, 9B).

200. CLOGHADOO LARTY (22). Not marked. The rock of Cloghadoolarty and fort of Cashelmongan remain. In 1402 a Rob. Dullard and others are given the lands of Leticia Ride at Kilmallock, in trust (Pat. R.). 1583 Cloghdullardy C., T. Burgat, of Kilmallock (Des. R., 8; Peyton, p. 15; Inq. Exch., 10). 1600 Jas. Gould held it at his death (Inq. Chan., 28B). 1657 Held by G. Ingoldesbye. It was then in Glynogrey (C.S., xxxi., p. 19).

201. GARRYELLAN (22). Site marked near Cashelmongan. Probably last-named C. 1655 The land held by J. Lysaght (C.S., p. 19). 1667 Granted to Lord Kingston.

202. BALLYEA (22-31). Not marked. 1583 Balliea C. and vill. in ffedamore (Des. R., 5B). 1588 Balliea C. and Killfedamore, to E. Manering (Inq. Exch., Jas. I., No. 25). Don. O'Grady, of Killfeadamore, complains that Mainwaring took a parcel of the lands in which Jas., Earl of Desmond, had enfeoffed J. O'Grady, his father. Clement Fanning, Pierce Creagh, and N. Fox also complain of assessments in "halface" money made by Mainwaring (C.S.P.I.). 1618 Surrender and regrant to D., Earl of Thomond (Pat. R.). 1620

Sir T. Browne, Ed. FitzHarris, and R. Delahoyd surrender Castle, &c., as granted to Mainwaring, xxx. Eliz., and by him to Browne for use of Earl of Thomond (*Ib.*). 1655 Held by B., Earl of Thomond (C.S., p. 18).

203. FANNINGSTOWN (22). Marked. 1410 Ballyanhiny or Fanningstown in Fedamore (Torn Rolls, White MS.). 1583 ffanyngstown or Ballynanyng C. (Des. R. 5B). 1592 Granted to Mainwaring (Inq. Exch., 25). 1618 By him to D., Earl of Thomond. 1657 ffaningestowne, a ruinous C., B., Earl of Thomond (C.S., p. 18).

Fabric.—The C. had fallen into utter ruin in 1840. It was 56 feet by 26 feet, but only fragments 6 feet high remained (O.S.L., 8, p. 378): not to be confused with Fanningstown in Croom.

204. SKOOL (31). Marked. Alleged by Dyneley to have been built by King John (R.S.A.I., ix., p. 197). 1583 The Earl of Desmond held Awney Manor “duobus lez Sculles in p’orhia de hospital” (Des. R., 3B). 1612 J. Stritch¹ held the C., bawn, water-mill, and two weirs at “ambo skules,” in fee; his son W. succeeded (Inq. Chan., Car. I., No. 89). 1624 Sir W. Parsons held the two Skulls, late estate of Alderman W. Stritch (Pat. R.). 1639 James held the C., bawn, and mills, “in duobus Skules” (Inq. Chan., 234). 1657 C. held by W. Hurley. 1666 Scull and Ballyneety confirmed to Capt. A. Ormsby. 1680 Capt. Ingoldesbye held it.

Fabric.—Almost levelled; only parts of the north and south walls, 10 feet and 22 feet high, stood in 1840 (O.S.L., 8, p. 378).

MONASTERANENAGH.

205. RATHMORE (31). Marked. Supposed to be the fort (and fair-green) of Aenagh beag (Aenagh Cloghair, or Enagh culi) claimed by King of Cashell, 902 (“Book of Rights”). 1148–51 Turlough O’Brien defeated the Norse, and built Monasteranenagh Abbey near it. Lewis says that the C. was built in 1306 by the Earl of Desmond, but it seems later. 1579 It was held by the Irish and Spaniards, and taken by Malbie after the third battle of Monasteranenagh. The Earl complains that it and the “town” were spoiled, and certain of

¹ The family of Stritch is claimed to be of Italian origin, and named Strocchi. 1295 G. de Rupe was charged with the death of Henry Stritch, who had wounded his brother, Walter de Rupe (Justic. R. Cal., p. 11). 1424 Nic. Stritch was bailiff of the city. 1461 Ric. Stritch was bailiff, and in 1440 was elected Mayor, after which the name often occurs in the lists.

his evidences and writings taken (C.S.P.I.). 1583 "Rathmore, a large C., in parts ruinous, with a barbican, ruined on the north, and a courtyard, enclosed with a stone wall in great decay. There are in the same C. divers necessary places, or bedrooms, strongly built for defence," with an iron door. Granted by the Earl, and Elinor, his wife, to Maur. Sheighan for 99 years, at a peppercorn rent (Des. R., 6 ; Peyton, p. 14). 1600 Surrendered to Carew by the followers of the Sугan Earl (Pacat. Hib.). 1615 Jas. Casey settled it on T. Casey, who, in 1637, bequeathed it to his daughters. They held it and a mill-seat in 1655 (Inq. Chan., 198 ; C.S., xxxi., p. 15). Sir Drury Wray next owned it. It was forfeited, and was sold 1703 (Trustees' Map, "21").

Fabric.—Tradition, in 1840, said that it was built by the Danes, and levelled by Cromwell. A fairly perfect peel tower, 30 feet by 34 feet ; the walls, 6 feet 9 inches ; features of the late fifteenth-century type (O.S.L., 9, p. 386).

206. CAMAS (31). Not marked. 1185 Camas from early times belonged to Monasteranenagh Abbey, being a Grange of same. 1583 T. and J. Browne held Camas C., in Grean, at the time of their joining the rebellion of Ger., Earl of Desmond (Des. R., p. 67 ; Inq. Exch., 11). 1613 Sir J. Jephson held, among the possessions of the dissolved religious houses, Camus cell, chapel, and glebe, in right of his wife (Inq. Chan., 5A). In 1655, shown as in Glenogra (D.S.A., 35). Afterwards held by the Bevans.

GLENOGRA.

207. GLENOGRA (31). Marked. 1239 Suit of Maur. de Londres as to two knight's fees in Glenogra (Close R.). 1280 The "theodum" held from M. FitzGerald by J. f. Thomas (service at Allecath). 1298 The latter died seised of the manor. A full account is given from the Manor Courts down to handmills, and "a grove from which the Lord can obtain nought but brambles and rods for carts" (C.S.P.I.). Geffry Mutteley held it in right of his wife, Alice, dau. of Ad Claragh (Pipe R.). 1323 The Crown took 8 acres as dower for Sibil Fareman (Plea R.). 1400-1420 The C. was built by the unlucky Tho., Earl of Desmond. The Earls held it till 1583. C. much ruined, without a roof (? "tect, voc. le stories" elsewhere), or floor. A circular area or yard, called a balne, of which the wall is in great decay, so that the C. is not defensible. Near it is an empty house, containing a cellar, or "story," which is habitable ; there is a water-mill within

the fortifications (Des. R., 5). 1598 Ed. Fitton, Sheriff of Limerick, fled, leaving Glinogra to the rebels (C.S.P.I., p. 325). 1600 Glinogra, a town of Sir G. Bouchier, was wasted by Piers Lacy from Kilquig (Pac. Hib. ii., p. 182). 1655 The Earl of Bath held Glynogrey and Cahirgillam(ore), where stand two C.s and a kearne.¹ Glynogrey, a C. with a bawn; 30 houses, cabbins, and a mill, courts leet and baron, &c. (C.S., xxxi., p. 17).



Glenogra Castle.

Fabric.—It consists of a court, 150 feet at the east side, and 180 feet to the south. The wall is of squared stones, and is 25 feet high and 5 feet thick. To the north-east is an octagonal keep, 19 feet across inside; 4 stories high, the second being vaulted. It has a turret on the south-west face; the stairs from left to right, an unusual feature. At the opposite side is a tall, triple chimney, its shaft closing an older window. There are neat, round-headed doors from the rampart. The bases of four vaulted turrets remain along the north wall; the main gateway is a pointed arch $8\frac{1}{2}$ feet high to the south (O.S.L., 9, p. 379).

208. CAHERGUILLAMORE (31). Not marked. Called "Rockbarton C" in the "Name Book." 1289 Cathrygilmore (Plea R. Cal., vol. ii., p. 77). 1298 Held by T. f. Maurice (C.S.P.I.). 1564 Dom. White, of Limerick, to hold Cahiringullimore, redeemed from late Earl of

¹ The occasional allusions to prehistoric and other remains in the Civil and Down Survey form by no means their smallest interest to antiquaries (see *infra*, also under Bulgaden-Fox and Kilfinnane). Some very interesting mention is found in the very full mearings of the C.S. of Tipperary.

Desmond, and purchased from its rightful owner. 1583 C. and vill. of Cahir a Gillimo (Des. R., 6B). Kagheraglylmoore in Any (Peyton, p. 14B). 1639 Jas. Stritch held it, as his grandfather, J. Stritch, had done (Inq. Chan., 234; see Scool). 1655 C. held by W. and E. Stritch (B.D., 121; D.S.A., 35). 1667 Granted to Capt. Rob. Morgan and to A. Reymon (Act Sett.).

Fabric.—A rectangular foundation, 150 feet to east of a stone ring, said to have been built with the ruins in 1835 (O.S.L., 9).

TULLABRACKY.

209. GRANGE (31). Marked. 1186 It is one of the "Granges" of Magio (Nahava, Coracoimgillain, Naglochmib, Cathercornii, *Loc Geir*, which belongs to the village of *Loc Geir*, Camuis and Imlevi), and is probably that of *Loc Geir* (charter). 1348-9 The Abbot of Magio accounts for issues of lands in Grangehawe (Gransha) in the king's hands by attainder of Maur., Earl of Desmond (Pipe R., 13). 1583 Graunsha de Lough (Gur), or Castleanedroyde (Peyton, p. 10). 1655 Grangew, Lord Bath (C.S., xxxi., p. 15).

Fabric.—Foundations 40 feet by 30 feet over all, and fragments 10 feet high and 6½ feet thick; on Carriganilea Rock (O.S.L., 8, p. 96).

KNOCKANEY.

210. LOUGH GUR (32). Bouchier's C. Marked. 902 The fort of Gair was claimed by the King of Cashel ("Book of Rights"). 1002 King Brian fortified Dun Gair and the Island in Loch Gair (Wars G. and G.). 1178 Dun Gair plundered by O'Collins of Cleanglas. 1186 *Loc Geir*, with the Island and Grange, given to Magio Abbey (charter). 1287 T. de Clare held, at his death, "Le Dun" at Loych Gir (C.S.P.I.). The castles were built in the fifteenth century, and held by the Earls of Desmond as one of their chief seats. 1536 Lord Grey went to Lokkere, a strong C. of James of Desmond, and found it deserted and open; the roof, doors, and windows burned or removed. "It standeth very pleasantly upon the foot of an Iland, containing 80 acres, environed with a great water and mountains, and rocks without the same; munited and warded more by nature than by man's hand" (Carew i., p. 103). 1583 "The Manor of Lough Gur, a large and excellent C., in a good state of repair; a chief house of the late Earl of Desmond, with an iron door at the entrance, strongly situated at the foot of a round, rocky hill to the east. A fishery is included, called a 'Logh,' replete with river fish. The C. in itself

includes nine separate rooms . . . and a barbican, built of stone, at an angle of which is a little round turret for defence. There are two entrances, that at the east by a narrow 'causea' and two doors; the other to the south-west, where is another small C. or peel. An island, an orchard, a garden, and divers other edifices or cottages, with gardens adjoining (where dwell divers tenants" (Des. R., 5). It was granted to Sir G. Bourchier, who let it to R. Rowley; the latter gave it in charge to Ulick Browne, who, in 1598, gave it to the followers of the Sagan Earl (C.S.P.I., p. 325). 1600 Carew, when clearing the way from Kilmallock to Limerick, came to Lough Gur, and the C. was surrendered by Oliver Groome, while 'J. f. Thomas was absent with the Earl (Pac. Hib.). The 'Bourchiers,'¹ Earls of Bath, continued to reside there in 1641. The C. was held for them by W. Weekes; but the garrison was "watched and waited on" by a Dr. Higgins and the Irish, till it surrendered to Lord Castleconnell. The latter "annexed" the household stuff left by Dame Barbery Browne, when she fled to Castletown in Kenry; two of Weekes' servants were (as we noted) hanged in the absence of Lacey of Bruree, and against his orders (Deps. 130, 314, 320). 1653 Capt. Jas. Synnocke got 100s. "for the garrison at Logighur," and as much "for corne taken from Edm. Rawley" by the garrison (Acct. R., 8). 1655 Loghguir C. and six houses, H., Earl of Bath (C.S., xxxi., p. 10). 1680 Dyneley found it, an island, and C. of great strength held by J. Bailey, and belonging to Countess of Bath. He gives a sketch of the C., lough, gate, and, in the distance, the "New Church" in ruins, and the towers of Dromin and Racanon (R.S.A.I., viii., p. 287).²

Fabric.—Castledoon or Bourchier's Castle.³ A peel tower, 49 feet by 33½ feet outside, 75 feet high, and well preserved. There are five stories in the usual two sections, the narrower with stairs and porch: each of the lower stories is vaulted; the third and fourth have rectangular, shafted windows. The causeway was 144 yards long

¹ The family of Boursier, Bousser, or Bourchier appears first in 1316, John de Boursier being warranted to hold assizes in Kent, Surrey, and Sussex, and afterwards was Lord Chancellor of England till 1341. The founder in Ireland was Sir George Bourchier; got a command 1567. Commanded the garrison of Kilmallock in 1571.

² Plate XIII.

³ The O.S.L., 9, p. 235, agree with FitzGerald's History in attributing the Castle to Sir G. Bourchier, *temp.* James I. It at least dates a century earlier; and the two castles appear in Hardiman Map, 59, and Des R.

across the boggy shallows of the lake. (See R.S.A.I., vol. x., p. 415, and xxxii., p. 196, by J. Grene Barry, and notes on the Bouchiers by Richard Langrishe, vol. xxxiv., p. 365, and xxxv., p. 21).

211. KILLALOUGH OR BLACK CASTLE.—*Fabric*—It is 25 feet by 13½ feet inside. The lower story is vaulted; the sides 35 feet high to south, 12 feet high elsewhere, and 7½ feet thick. The gateway is beside it to the east (O.S.L., 9, p. 234).

212. GARROD'S ISLAND, in the lake, traces of a building, said to be a C. of Earl Garrod, whose ghost is doomed to ride over the lake once in seven years, till the silver horseshoes are worn away.¹ Doubtful site.

213. KNOCKFENNELL (32). A strongly-fortified hill (FitzGerald i., p. 313) in 1827. It had to the west a stone fort built of blocks 3 feet square, with small ones inserted, the wall 10 feet thick and high, and 120 feet across the ring, with long walls, 60 yards apart, down the north slope, and at the east end was a lesser fort and similar long walls. Even in 1840 it was only a ring and heap of stones. Now only a slight mound remains. It is a reputed C., so we give it to complete the strongholds of Lough Gur. Doubtful site.

214. ELTON (40). Not marked. 1585 Elltown C. granted to Sir E. Fitton (Fi. 5032), and held by him 1606 (Inq. Exch., 9). 1607 Grant to N. Haward (Pat. R.). 1621 Held by W. Haly with Ballinlyng or Lillingstown (Inq. Chan., 8, 240, 244). 1653 Leased to Quartermaster J. Chinnery (Hartwell Acct. Book) Ruinous C., late of N. Haly (C.S., xxxi., p. 9).

215. KNOCKANEY OR AINE (32). Two C.s marked. The place was famous in early legend. "Two" legendary battles, "A.M. 3772 and 4422," in "each of which" a high king, Eochy, fell, are placed here (one legend, two chronologists); Cuchullin, from its hill, points out the surrounding lands and hill to Laeg, on the raid to Tara Luachra; and Aine's father was there slain by King Oilioll Olum. Circa 440, St. Patrick visited Drom Colchoill, or Aine Cliach. ("Colloquy," Silva Gadelica, ii., p. 576). It formed the centre of the Martini Tribes (Egerton MS., 92). To come to history. In 666 a fierce battle was fought at Aine between the Aradha and Ui Fidgeinte (A. F. M.). 1002 King Brian repaired the fort of Dun Cliach at Aine (*Ib.*, Wars G. and G.). 1199 C. d'Any was granted to J. de Gray. 1226 The fair at the manor was granted to G. de Marisco. 1253 Any reserved as dower for Queen Eleanor. 1262

¹ Lenihan, p. 725, *Revue Celtique*, iv., pp. 185-191.

Granted to W. Bassingburn in exchange for the manor of Bliburgh. He mortgaged it 1284 to the Ricardi bankers. 1278 It was granted to T. de Clare, and was surrendered by Edm. de Bassingburn. 1294 Granted to Geff. de Lezingnan by mistake (C.S.P.I., under dates). 1295 The fair of Ainey is named (Justic. R. Cal., p. 39). 1300 Geof. f. Payn and H. f. J. f. Ralph Burgess of Any fought "for an old anger." Geffry struck Henry on the head with an axe, struck him down, and hit again, when the handle broke, giving Henry a large wound to the damage of 40 shillings (*Ib.*, 343). 1325 Held in trust for T., son of Ric. de Clare, a minor, as recently held by J. f. Adam of Owaynestown, the rents to be paid to Rob. de Welle and his wife, Matilda de Clare (Pipe R., 50). 1381 Sir Jas. Delahyde, sheriff of Limerick, was slain by M'Gynouse. Petition of Sir T. Clifford and his wife Johanna, as to the fine of Delahyde's estates at the manor of Any with Dromyn and Corkmoych (Mem. R., 1539). 1406 The custody given to T. f. Morice (Exch. Rec., Hen. IV.). 1413 Lord Clifford was baron of Any; the place was held by Lord T. le Botiller, Prior of St. John of Jerusalem (*Ib.*, Inq., Hen. V.). 1515 Jas., Earl of Desmond, took Any C., but was repulsed from Lough Gur (Ann. Ult.). 1541 The preceptory and manor were granted to N. Fanning, &c. (Fi. 216). 1568 To W. Pers and J. Cockerham (Fi. 1258). 1578 To Sir E. Fyton and W. Apsley (Pat. R.). 1583 Awey Manor, the C. there entirely ruined, except the stone wall, with a great enclosure called the balne, a water-mill, "upon the rivulet of Comocke," &c. (Des. R., 4). 1589 Confirmed to Edw. and the other children of late Capt. W. Apsley (Fi. 5347). 1627 Held in fee by F. Fitton, "the C. and walls" (Inq. Chan., 42, 191). 1641-2 Capt. H. Grady, of Knockaney, took part in the siege of Ballyalla C., County Clare (Cuffe's Diary). 1655 Fawancasland, near the hill of Aney, held by Thady Grady, sold to Ric. Coote (B.D., p. 119) with Burgess Lands. "The other C." and mills held by Jas. and Dermot Grady (C.S., xxxi., p. 6). The "Black C." shown to the east, the "White C." to the west, of Aney (D.S.A., 31, 33). 1688 J. Baggot, of Aney (Trustee Map, "21"). 1703 The hill of Aney, late estate of Jas. FitzGerald, purchased by Alderman B. Burton.¹

¹ The Burtons were an ancient Shropshire family deriving from Sir Edward of Longner, who was made a Knight banneret in 1460. They were established in Co. Clare by Samuel Burton, son of T. Burton, of Estwick, Shropshire (whose brother got a grant of Buncraggy in 1611). Benjamin was his younger son. See R. S. A. I., vol. xx., p. 74.

Fabric.—The “Desmonds,” or “Black Castle,” or “East Court,” now levelled. FitzGerald calls it the noble ruins of a castle on the river, erected by the Earls of Desmond (vol. i., p. 307).

216. THE WHITE CASTLE, or KNOCKANEY C.—It had three stories, the lowest vaulted, 22 feet by $13\frac{1}{2}$ feet inside, 40 feet high, with walls 7 feet thick. 300 yards to the east was the “Court” of the Earls lying to the south of the river. Tradition says it was built by the Earl’s steward, Matthew O’Grady, while Desmond was abroad. (See Rev. J. Dowd, “Round about County Limerick,” p. 88; O.S.L., 9, p. 269; and FitzGerald, vol. i., p. 307.)

217. BAGGOTSTOWN, WEST (40). Marked. The Baggot family was established in Limerick before 1290. In 1587 the head-rent of Edm. Boggott, of Baggotstown, was granted to Sir E. Fyton (Fi. 5032). 1609 The C., mill, and weir granted to Baggot and Don. O’Grady (Pat. R., Inq. Chan., 3A). 1642 J. Baggot, of Baggotstown, was a member of the Kilkenny Parliament. 1651 Maur. Baggot exempted from terms in the surrender of Limerick to Ireton, which was signed by his father. 1653 C. held by Cap. W. Hartwell (Acct. Book). 1655 Ballinvogodock, or Baggotstown C., “Ballingoody ould C. and ould bawn,” held by T. Browne and Derby Grady (C.S., xxxi., p. 24; and D.S.A., 33). 1690–1 Cap. Hugh Massy garrisoned it between the sieges of Limerick to protect it from the Irish (History of Massy Family, Ed. 1890, pp. 238–9). 1703 Baggotstowne, estate of late J. Bagot,¹ as granted to H. Lord Sidney, sold to B. Burton.

Fabric.—The east and south walls of the main wing are perfect. It is 33 feet by 23 feet inside, with three stories, the lowest vaulted. At the north-east corner is a tower $14\frac{1}{2}$ feet by $13\frac{1}{2}$ feet, with arched spiral-stairs, having five stories, the lowest also vaulted. The walls are 6 feet 8 inches thick, and the mullions, frames, and hoods of well-cut stone. Two oak beams remained across the building in 1840. The tall, clustered chimneys are of pleasing design; a stone fell from one of them with the date “1019,” evidently 1619. There are bartizans to the outer angles of the wing and turret (O.S.L., 9, p. 271; with views, Len., p. 736).

KILFRUSH.

218. KILFRUSH (40). Not marked. 1287 J. de Carreu held a knight’s fee in Kilfroys in Aney Manor under T. de Clare (C.S.P.I.).

¹ John Baggot, 1693, late of Baggotstown, in May, 1689, at Dublin, committed and perpetrated treason against the King and Queen, and died at Limerick in manifest rebellion (Inquis. Wm. III., vol. xviii.).

1289 Matilda Anevil claimed dower off Kilfrush (Plea R.). 1583 Kyllfrushe C. held by Earl of Desmond (Des. R., 3B; Peyton, p. 14). 1587 The head-rent of W. Nugent, of Kilfrush, granted to Sir E. Fyton. 1604 Confirmed to Morice Hurley, of Knocklong (Pat. R.). 1655 Held by Sir Morrish Hurley (C.S., xxxi., p. 5). 1657 Sold to J. Bullingbroke, &c. (B.D., 118).

219. GORMANSTOWN GRADY (40). Marked. 1574 Pardon to Edm. Fox, *alias* Boskagh, of Gormanstown (Fi. 2472). 1583 Ballygorman, *alias* Gormanstown, in Poblebuskagh, *alias* Foxe's country, Jas. ffox (Des. R., 3B; Peyton, p. 11). It was held by the same family till 1655; Gormanstown, decayed C., Edm. ffox. (C.S., xxxi., p. 13).

Fabric.—It stands beside the Morning Star River; and measures $17\frac{1}{2}$ feet by 8 feet inside; walls, 3 feet 9 inches thick. Two doors to the east and west, the latter carved with crosses and circles. It is 24 feet high, and has the lower room vaulted (O.S.L., 8, p. 275).

220. GARRYSULIBINE (40). Not marked. The C.S. (xxxii., p. 13) shows it as adjoining Bulgadin Eady on the south, Ballystonybeg and Ballyvulhane on the north, Ballycolloo on the east, and Cosmagh Barony on the west, as vol. xxiv., pp. 17 and 19, and the D.S.A. Map, 34, show that Tankardstown¹ and Ballybeg are included by mistake. We get Ballinamona as corresponding to Garrysculibine, not to be confused with two other C.s in the other Ballynamonas (see *infra*, 222, 223). 1583 Garriskowleben C. (Des. R., 32, 33B; Peyton, 11B). 1655 Ballyvulligidin and Garrisculibine ruinous C., Edm. ffox (C.S., xxxi., p. 13; D.S.A., 34).

221. ADAMSTOWN OR BALLYHYWARD (32). Not marked. 1583 Ballyhyward, between Gormanstown and Bagotstown (Peyton, 11). Ballyadam with Ballytanekards and Garriskullibine (Des. R., 33B). 1655 Adamstown decayed C., Edm. Fox, of Bulgiden Fox (C.S., xxxi., p. 13).

BALLYNAMONA.

222. BALLYNAMONABEG (32). Not marked. 1287 Vill de Mora (C.S.P.I.). 1583 Two C.s in Ballynemonybeg J. Browne (Des. R., 67B; Peyton, 12B; Inq. Exch., 11). 1607 N. Haward held it (Pat. R.), in 1637, F. Fitton of Anny (Inq. Chan., 191), and in 1655, Morris Baggott (C.S., xxxi., p. 24).

Fabric.—It stood near the west wall of the graveyard, but was levelled before 1840.

¹ Not to be confused with the other Tankardstown. See section 190, *supra*.

223. BALLYNAMONAMORE (32). Not marked. 1583 Jas. ffexe held the land (Des. R., 33B); the C. was held by J. Browne; the next year by Sir E. Fitton (Inq. Exch., 19); by N. Haward, 1607; by Edm. Baggott and D. O'Grady in 1609-10; the latter held one third of the C. with the loft and half the cellar (Pat. R., and Inq. Chan., 191). 1655 It was held by Ed., Ric., and Maur. Rawly (C.S., xxxi., p. 22).

224. CASTLE FARM (32). Not marked. Named perhaps from Hospital C.

HOSPITAL.¹

225. HOSPITAL (32). Marked. The preceptory was founded by G. de Mariscis, 1215 (see Proc. R.I.A., xxiv. (c.), p. 449). It (or a C. near it) was used as a residence after the dissolution. 1578 C. granted to W. Apsley. 1655 Hospital held by T. Browne (C.S., xxxi., p. 5). The C. stood, according to tradition, not far from the preceptory to the east of the bridge, and on the north bank of the river. No trace remains.

226. KNOCKMONYEE C. in Hospital Aney. 1582 J. Browne, slain in rebellion at Aherloe, owned a broken C., built square, on top of a little mount called Knockmunihy (Des. R., 67B), Knockmonyee C., Knockmonihy, 1584, or Cloghmonohy. Knockmono lay near Ballemonebeg (Inq. Exch., 29 Eliz., and 11; Hardiman Map, 50; Peyton, p. 18), granted to Fyton, 1587, and to N. Haward (Knockmonine C.) in 1607 (Pat. R.).

227. BALLYCAHILL (32-40). Not marked. Ballykahell C. in Greankoeragh, 1586 (Peyton, p. 80).

KILCULLANE.

228. BALLINSCOOLA (32). Not marked. 1583 Ballinscowley, Earl of Desmond (Des. R., 3), two towers marked (Peyton, p. 80). 1609 Don O'Grady, of Kilballyowen, held Ballynskeulye in Kilkillane (Inq. Chan., 3A), and Ballineskooly C., bawn, and town (Pat. R.). Not to be confused with Ballinscaula.

229. KILCULLANE (32). Marked. 1186 Grant to Magio Abbey of Magnahengi, from the ford of the Scivil, with the whole marsh to

¹ The hospital with the adjoining lands was granted by Elizabeth to Sir Valentine Browne, who is said to have built the C. His son, Sir T. Browne, married a daughter and heiress of W. Apsley, by his wife, Annabella, daughter of J. Browne, Master of Aine.

Kilkellin and Kilkellin itself (charter). 1244 Adam de Anno held Kilcullan at rent of a soar hawk and $\frac{1}{2}$ mark of silver. Godfrey de Anno was heir (C.S.P.I.). 1287 J. Daundon held it from Sir T. de Clare, as of Any manor, at rent of one pair of furred gloves and six pence (*Ib.*). Ralph Brun, of Kilkelen, fined (*Ib.*, 155). The Browne family appear to have held it thenceforward. 1583 T. Browne held Kylkyllane C. and Camas (Des. R., 67B; Peyton, p. 13; Inq. Exch., 11). 1607 Grant of these to Walter and E. Browne (Pat. R.). 1610 Edm. Baggott and D. O'Grady were granted Kilkillane. 1655 The decayed C. held by Teige O'Grady (C.S., xxxi., p. 22; D.S.A., 38).

CAHERCORNEY.

230. RAWLEYSTOWN COURT (23). Marked. The Rawleys or de Raleics are one of the oldest Anglo-Norman families in Co. Limerick, having settled there before 1222. In later days they have been confused with supposed descendants of Sir Walter Raleigh. (See FitzGerald's assertions, vol. i., p. 305). 1587 Sir E. Fytton was granted the head-rent of Jas. Rowley, of Ballinrowley (Fi. 5032). 1600 Pardon of Ric. Rowlie, or Raleigh, of Raleighstown, pardoned after the Sугan Earl's rising (Fi. 6452). 1607 The head-rent of Jas. Rawley, of Ballinrowely, granted to Nic. Haward (Pat. R.). 1609 C. held by D. O'Grady, of Kilballyowen (Inq. Chan., 2A), to whom with Jas. Rawley it was granted, 1610 (Pat. R.). 1655 Rawlighstown C. ruinous, Redmond Rawley.¹ It was then part of Kilpeacon Parish. A tower, with a garth and turrets at the angles shown (D.S.A., 31-37; C.S., xxxi, p. 21). 1667 Lord Kingstown confirmed in it (Act Sett.). 1709 E. Croker held it.

Fabric.—It probably dates from the reign of James I.; tradition attributes it to Rawleys, and says that it had been sold to the Crokers. The enclosure is about 180 feet by 120 feet; it has a square turret with loopholes at each corner, and walls 12 feet high and 4 feet thick. Within is a strong house, 80 feet by 30 feet, of three stories. The two Down Survey maps show it as a battlemented peel tower in a square court, with turrets at each angle.²

¹ Lenihan, p. 746, gives the epitaph (in the Church of the Recollects, Paris) of "Messire Michel Raleigh de la famille de Raleighstown," Knight of the Order of St. Louis, died 1732, aged 76. The family still flourishes in Co. Limerick.

² Plate XIII.

BALLINARD.

231. BALLINARD OF CAHERHUSSOK (32). Marked. 1251 Catherussoc (Plea. R.). 1287 T. de Clare leased it to H. f. John (C.S.P.I.). 1302 Adam f. Philip held it (Pipe R.). 1325 Ric. and Avelina de Midia to reply to him about Cathyrussok (Plea R., 127). 1583 Maur. Mac Shane held Ballynahard C. and vill (Des. R., 37B). 1657 Capt. Garrott FitzGerald held Ballynahard (C.S., xxxi., p. 26). This family held it till late in the following century.

Fabric.—The C. was standing in 1827, but was levelled before 1840. It stood to the north of the church.

232. CLOGHAVILLER (23-32). Not marked. FitzGerald renders it "Clogh a Fiolar," or Eaglestown, in 1827. 1583 Cloughviller, *alias* Cloughbuddinviller (Des. R., 3). 1587 The head-rent of W. Marshall, of Cloughvillen, granted to Sir E. Fyton. 1657 Clogh Ivillin, decayed castle, W. Marshall (C.S., xxxi., p. 26). 1666 Clogheviller, Clogher or Cloghermillagh, confirmed to A. Ormsby, and 1670 to Rob. Reading under trusts of Earl of Mountrath (Act Sett.). 1703 Ric. Powell, of Cloughviller, purchased estate of King James at Gallbuoly.

233. HERBERTSTOWN (32). Not marked. 1583 Ballyhibbert or Ballyhubberde C., next Kylkyllane, held by Earl of Desmond (Des. R., 3; Peyton, 12B). 1587 Head-rent of W. Ridiford on Ballyhubbard granted to Fitton. 1657 Hobertstown in Kilkellan, Tha. O'Grady and others (C.S., xxxi., p. 22). 1667-8 Haywardstown granted to Lord Kingston. 1670 Hubbertstown under Mountrath trusts. 1673 Granted to Rob. Reading. There seem to have been three Ballyhywards, Adamstown, Howardstown, and Hubbertstown or Herbertstown. A Sywardstown, in the service of O'Conyll, 1452, was evidently near Rathkeale (see Rental O'Conyll; also C.S., xxxi., pp. 23, 15, 28; also sections 185, 221, *supra*).

BALLINLOUGH.

234. CROMWELL (33). Not marked. The Cromwells are an early English family in County Limerick¹; they possibly took their name from this place "Cromchoill," Cromellston, in County Limerick, named in 1299 (Plea R.). 1325 Isolde Cromwell had dower on

¹ The Gromewells appear among the magistrates of Limerick. We find bailiffs of the name in 1426, 1475, and 1486.

Ballygodan (*Ib.*, 144). 1399 The custody of the estate of Ric. Harold in Ballylogh, disturbed by his widow (Mem. R.). 1578 Pardon to J. Mac Morris O'Rahelly, of Cromal (Fi. 3364). 1583 Knockgromell, a poor, low C. or peel tower (Des. R., p. 6). It is called "Cromwell-oknowing" C. (Peyton, 15); Cromyglawn (*Ib.*, p. 228), and Gromewell (Carew). 1591 C. transferred by W. Agar to W. Carter (Inq. Chan., 6B). 1597 Jas. Cromwell got a lease of Corcomohead from the Cathedral Chapter (Exch. Records, p. 6). 1607 Cromwell or Cromawall C. to N. Haward (Pat. R.). 1637 Fra. Fitton, of Anny, married J. Lacy, and held, with other lands, Cromwell or Cnocknegromwille; he was "a distracted lunatic and non compos mentis" (Inq. Chan., 191). 1655 Cromwell, W. Fitton, and Annabel Browne (C.S., xxxi., p. 3; Petty Map, 68; B.D., 118). 1688 Jas. FitzGerald, of Cromwell, attainted (Trustee Map, "21"). 1703 Sold to B. Burton.

KILTEELY.

235. CARRIGKITTLE OR CARNKETTLE (33). Not marked on rock of Carrickittle; but foundations remain. One of the oldest castles in County Limerick. 1199 J. de Gray was granted the lands between it and C. d'Any. King John granted to W. de Naish the C.s of Karakitel, and the theudum of Lirickmadh, and cantred of Huheny (C.S.P.I.), Karrakytel C. and Kyldrumon as in copy in Gormanstown Reg., p. 210. 1291 The rector of Athissel had a portion at Carnketil in Grene. 1297 Suit of W. Whitfot, father of Matilda, wife of Ric. le Mouner, who held Carrigkitel of which Ric. and Marg. de Londres were tenants (Plea R.). 1307 Karnekytele and Killtyle were granted to Sir Phil. Wolfe (Gorm. Reg., p. 211). 1309 Held by Sir Walter L'Enfaunt in capite at £14 10s. 6d. before their delivery to Alex. de London, cousin and heir of Johan, wife of said Walter (Pipe R.). 1318 The Crown took up Kyltil; Nic. an Juliana de Lees^r held Carnkityl, Clothurolethan and Clothursyne (Plea R., 121, m. 2). 1373 W. de Londres alienated Carryketil to E. Bagot without^r license (Pipe R.). 1410 *circa* Walter Bourke assigned to his third son Tiboit the seisreachs of Britas, Rathsiurtain, Carraigeiotal, and Baileloisge (Burke Rental). 1510 Garret, Earl of Kildare, and the English built a C. on Carraigeital (A.F.M.). 1537 The profits of this Manor, forfeited by Silken Thomas, taken by Jas. f. John of Desmond (Carew i., p. 131). 1583 Ger., Earl of Desmond, traitor, held, on his^r entry into rebellion, the little C. of Carrigkittle, a small C. or peel situated on the top of a mount in Kiltyly (Inq.

Exch., 10; Des. R., 6; Carew ii., p. 450). 1605 Sir E. Fitton owned it. 1655 Sir Maur. Hurley held it (B.D., p. 118; Petty Map, 68; C.S., xxxi., p. 4); sold to Oliver Ormsby and confirmed 1666 (Act Sett.).

KILMALLOCK.

There are unusual masses of material for the civil and ecclesiastical history of this place. As our object is rather to record the Castles, we merely refer to the charters of J. f. Elie Juvenis, of Phil. f. John f. Tho., W. Puff, T. Stoke, and Ade f. John f. Geffry, 1287-90, in B.B.L.; and to the elaborate surveys of 1655, in the Down and Civil Surveys, Book of Distribution, Cromwellian Account Books and Rolls, and the trusts of the '49 officers. In 1574 the place was plundered for three days by Jas. Mac Maurice, the Sweenys, and Sheehys, then "the houses both of stone and wood were broken and burned," and the town "became a receptacle and abode of wolves."

236. KING'S CASTLE (47). Marked. 1206 King John ordered Meyler f. Henry to inquire whether the C. of Kilmallock belonged to Cork or Limerick (C.S.P.I.). 1302 The citizens were fined £14 for murage (Pipe R.). 1375 Edward III. granted the Provost and Commons certain tolls and customs for ten years to fortify the town; and Henry IV., in 1408, made a similar grant for twenty years (Pat. R.). The C. seems later than these grants. 1583 The Earl of Desmond held a tenement named Lauery near the C. (Des. R., 6B). 1588 The C. granted to H. Billingsly, and 1604 to T. Browne of Aney. 1645 Used as a chief arsenal by the Irish under Lord Castlehaven. 1651 Used for a hospital and depôt by the Parliamentary Army. 1655 The King's C. south of St. John's Street named (C.S., xxvii., p. 15). 1667 Col. Randall Clayton confirmed in a plott near it.

Fabric.—It is a peel tower, with 70 stone steps and a large arch to one side; used in later days as a forge. It is about 60 feet high and battlemented (Dowd, "Co. Limerick," p. 11). For its rescue from demolition, see Journal R.S.A.I., vol. xxviii., p. 175. There is a view in FitzGerald's History, vol. ii.

237. PAROSTY OR DOROSTY. 1607 Jas. Fox held the stone house called Parostie (Inq. Chan., 27B). 1655 The C. was held by J. Fox with a waste plot, and had one room in each of its three stories (C.S., xxvii., p. 28).

238, 239. THE MIAGHS' CASTLE, John's Street. There were two C.s

in 1657. [238] That of Laur Miagh¹ to the west of the street, with the town wall to its west (C.S., p. 10); and [239] a second of David Miagh, with two lower, two middle, and one upper room, its garden meared on the east by the town wall (*Ib.*, p. 5).

240-243. HIGH STREET CASTLES. [240] Geo. Miagh's C. on east side, meared by Friar's lande to north (*Ib.*, p. 15). [241] Francis Creagh's C. with the churchyard to the east (*Ib.*, p. 17). [242] Jas. Bluett's C., and [243] Gerrot Miagh f. Dominick had a C. to the west of the street (*Ib.*, p. 26). Col. Randall Clayton was confirmed in a C. fronting the street on the west side, with a ruined backhouse and a yard (Act Sett.), evidently the last-named C.

244. VICAR'S CASTLE. 1653 G. Talbott held it (Hartwell Acct.). 1667 Col. Clayton confirmed in the Vicar's C. in Limerick Street, with the garden behind it (Act Sett.).

245-250. OTHER CASTLES. [245] 1607 Jas. Fox held a C., orchard, and garden in Blee street (Inq. Chan., 37B). 1653 [246] Jas. Lewis held an ould C. backward, &c. [247] Lau. Wall an ould C. [248] Capt. R. Stannard, a large stone house, an ould C. and backhouse (Hartwell Acct.). 1667 [249] A front ruined C. in Vicar's lane, and [250] a large C. at the corner near the cross² (Act Sett.).

251. WATER GATE CASTLE. 1655 A C. and garden to the north of the Water Gate (*Ib.*, p. 20).

THE TOWN GATES were:—1. John's Gate, to the west. 2. The Friar's Gate, to the north, opposite the monastery. 3. The Water Porte, to the east, near the bridge. 4. The Ivy Porte, to the east; and 5. The Bla-Porte, or Blossoms Gate, to the south-east. The last is in excellent preservation, with an arched gateway, and a room over it. See Hardiman Map, No. 62.

252. PROPPINGE. 1655. Where stands a small butt of an old C. north of the river Glen (C.S., p. 68).

253. COURTERUDDERY. 1579 The White Knight's C., manor and C. of Courterodderly, near Kilmallock, granted to T. Burgeate

¹ The family of Myagh appears as settled in County Limerick from 1290 (Plea R.).

² The deed of J. f. Elie Juvenis, *circa* 1270-90, in B.B.L., p. 63, mentions "Flemyn stret opposite the cross." This deed names as in Kilmallock "the great water to the north," the Main Street, Church of SS. Peter and Paul, Clapat Street Via Regalis leading towards Imelach, Water Street, Botherbalmekyne to east Fontislae to south, Martynylake to north, and Kokytlach (? Hokyrt or Cokyrt). Two undated charters, p. 68, name Fotisland, the tenement of Sandyr the Harper Aroldishyl on the Via Regalis, p. 70; St. John's Street, p. 71.

with a mill, property of John oge FitzGibbon, the White Knight.¹ 1586 C. named by Peyton (p. 23). 1587 Granted to G. Beston and Lau. Bostock (Carew, i., p. 450). 1590 Grant to Edm. FitzGibbon, the White Knight, of the site of the C. of Court Rudderye, near Kilmallock, "surrounded with a stone wall, the Court being ruinous," and the water-mill (Fi. 5517). 1617 Maur. Hurley, of Knoeklong, settled the ruined C. of Court Inruddery, water-mill, little garden called Garrenruddery, &c. (Inq. Chan., Car. I., 189). 1655 Courtneruddery, an old ruinous C., and waste mill on river Gleane outside the town walls, having the river to the west and the (Dominican) Abbey land to south (C.S., p. 52).

254. CASTLE COOTE (47). Site marked near Ashill Towers.

COSHLEA.

The district along the "foot of the hills," Cois sleibhe, or Coshlea, is called in the Dindshenchas Mag Findabrach, perhaps from Knockfenora, near Bruree.² Much of it was included in Aherloe, Eatharlach, which the Normans called Natharlach, and Atharlach. The early legends and forts of Kilfinane, Dungleare, Knoeklong, and Duntrileague attest its early importance. It is the most picturesque portion of County Limerick, being overhung by the Galtees and Ballyhoura Mountains, and rich in most lovely glens and streams.

UREGARE (now in Small County).

255. BULGADEN FOX (40). Not marked. See next. 1577 J. Fox,³ of Bulgedine, was pardoned (Fi. 3040). Peyton gives Bulgedden Buske C., "Boskagh" being the Fox family (p. 11B). 1587 Sir E. Fitton

¹ For the history of the White Knights, see Journal R.S.A.I., vol. xii. (1871), p. 591, by Rev. Jas. Graves; also in vol. xiv. (1877), Appendix, p. 299, by Miss Hickson.

² Dindshenchas, ed. W. Stokes, No. 118 (*Revue Celtique*, 1895, p. 69). Knockfenora (O.S., 39) suggests a possible claim for it as Cathair Fhionnabhrach (see Book of Rights) as against Ballykinvarga. I incline to the older view from the closeness of Knockfenora to the fort of Bruree telling against a second fort being claimed at that place, while Ballykinvarga, Cennathrach, and, probably, Caechan Boirne and Tuam na heidhin lay round the edge of the territory of the Corca Modruad tribes, to hold them in fealty to Cashel at least in theory.

³ This was an old city family said to have been Irish. T. Fox was bailiff of Limerick, 1445.

was granted the head-rent of Jas. Fox in Ballygidden; it was £6 in "half-face" (Fi. 5032). 1655 Ballyvullygiden, ruinous C. of Edm. ffox (C.S., xxxi., p. 13). Bulligiden Fox, "in it stands a C. and a rath" (D.S.A., 34). 1666-7 Granted to Capt. Rob. Morgan (Act Sett.).

KILBREEDY MAJOR.

256. BULGADEN EADY (40). Marked. There was a legendary Battle of Belgaden between Fiacha-Labhraim and Eochy, King of Munster, A.M. 3751. 1583 Ead. Lacy held Bulligidinea(dy), evidently called from his name (Inq. Exch., 11; and Des. R., 32). 1612 Odo, or Eady, Lacy, of Bruree, was granted the C. and manor of Boullygidinebeg or Ballygidineady (Pat. R.). 1655 See D.S.A., 50, 56. It was confirmed to Capt. Hugh Massy, 1666-7.

Fabric.—It measures $22\frac{1}{2}$ feet by 18 feet, with walls $7\frac{1}{2}$ feet thick, and has two doors to the south, the western leading to a spiral stair; the lower story is vaulted.

257. FANTSTOWN (48). Marked. 1583 Jas. ffant held ffantestown or Farron Inanta (Inq. Exch., 13). T. Burgat then held the C. of Fantistowne, *alias* Ballinantie, *alias* Ysbardstown; his son John succeeded; the lands were in Athenessa Manor, under Earl of Kildare (Inq. Chan., 150). 1630 J. Burgat, of Fantstown, was trustee to Jas. Casey, of Rathmore (*Ib.*, 198). 1657 J. and Ellen Burgat held it (C.S., xxv., p. 14; D.S.A., 50, 56). 1666 Fantstown confirmed to Capt. H. Ponsonby and Lord Colloony (Act Sett.). The Fants resided near it till at least 1709, when N. Fant, of Kilmallock, made his will (Limerick Registry).

Fabric.—The C. is 34 feet by 16 feet 9 inches; walls, 5 feet 9 inches thick. The east door is pointed inside, and round outside; there are three stories; the second is vaulted. The fire-places and spiral-stair are perfect, the latter 50 feet high. There are bartizans to the north-west and south, all well preserved (O.S.L., 8, pp. 258-261 and view).

258. MOUNT BLAKENEY (47). Marked. The south wall of the C. is down.

259. BALLYCULLANE (39, 40). Not marked. 1320 Ric. and Pat. L'Enfaunt held Ballycollen from Sir T. de Luē as part of the manor of Andesse, County Limerick (Mem. R., No. 34). 1657 The bawne of Ballycullane in Athenessie held by Patrick Kearney (C.S., xxv., p. 11). A doubtful site.

ATHENEASY AND KILBREEDY MAJOR.

260. GIBBONSTOWN (40–48). Not marked. 1572–4 Pardons of Ger. mac Thomas of Ballygibbon (Fi. 2158, 2472; Hardiman, No. 56). 1655 Gibinstowne ould ruynous C., by N. Haly; also the seats of two grist-mills in Kilbreedy (C.S., xxv., p. 11; and D.S.A., 56).

EFFIN.

261. BRICKFIELD OR KILBIGLEY (55). Marked. Ardskeagh C. in Kyllbyggeley (Peyton, p. 238).

Fabric.—The W. wall, 50 feet high, 5½ feet thick (O.S.L., 8, p. 338).

BALLINGADDY.

262. MILLTOWN (48). Not marked, perhaps Millmount. 1583 W. f. Ric. f. Edm. David MacGibbon, *alias* MacDavid Nynnagh, held the C. and mill of Milltown near Kilmallock, when slain at Cloghdalton in the rebellion of Sir John of Desmond (Inq. Chan., 49B). 1655 Old ruinous C. and seats of two grist-mills, and a tucking-mill by W. Creagh (C.S., xxv., p. 15).

263. MILLMOUNT (48). Site marked in Gotoon and Castlefield. The railway now crosses its foundations.

KILQUANE.

264. BALLYMACSHANEBOY (55). Marked. 1590 Shaneboye and Knockshandeboye (Hardiman, No. 56). In 1655 it formed part of County Limerick, Ballyshondeby C. (C.S., xxv., p. 19; D.S.A., 58). There seems some confusion between it and Ballyshandechey.

Fabric.—Only an arch remained in 1840 (O.S.L., 8, pp. 317–339).

KILFINNANE.

265. KILFINANE (48). “Castle Field.” Marked. 902 The great fort of Treada na riogh (Book of Rights) stands near this village. 1350 Walter Purcell held Kilfinnan from J. f. Peter le Poer, Baron of Donnyll; his heirs were minors (Pipe R.). 1588 Garrett mac Thomas held Kylyfynen; granted to Billingsley (Carew, i., p. 450; Fi. 5171). 1590 Edm. FitzGibbon, the White Knight, was granted the head-rent of Kilfynan in tenure of Ger. mac Richard, and W. Teige (Fi. 5517). 1598 Mr. Aylmer, who held Kilfinian, left

it without men or victual (C.S.P.I., p. 325). 1607 The manor granted to E. Fitz Harris (Pat. R.), 1657. Kilfinane, "where there is a good C., the walls of a church, and an Irish Downe." 1666 The C. was granted to Rob. Oliver (see also D.S.A., 50, 59; C.S., xxv., p. 25).

266. GARRYNLEASE (48). Not marked. 1655 Garrileasy C. and iron gate, Sir E. Fitz Harys (C.S., xxv., p. 25). Perhaps same as last.

267. BALLENDROMITE C. held with Kilfynan, 1590, by W. Teige under the White Knight (Fi. 5517). It was in County Limerick in 1590, in Aherloe. Now in County Tipperary.

PARTICLES.

268. CLOGHNOFYOY OR CASTLE OLIVER (56). "Castle Hill." Marked. 1576 Edm. Fitz Gerald (f. Jo. oge Gibbon) was granted the chief rent of Cloghnodfoyle held by J. Langan (Fi. 2873). 1657 Cloghnodfoy C., old ruined stone house and bawn¹ held by Sir Ed. Fitz Harys (B.D., p. 96; C.S., xxv., p. 23). 1666 granted to Rob. Oliver.²

EMLY GRENNAN.

269. DARRANSTOWN (48). Not marked. 1590 Ballydorant (Hardiman, No. 56). 1657 Dorrenstown, old ruined C. in Athenessie (C.S., xxv., p. 11), confirmed to Lord Collooney (Act Sett.).

DARRAGH.

270. BALLINACOURTY (56). Site marked. It is the ancient court and manor of Dermochi, or Darragh-Mochua, 1185. Darachmuchua and the court of the monks of Limerick to Magio Abbey (charter). 1317 Isabella de Cogan and Garrett Roche, Lord of Fernagen, claim rents on Glenanlara and Dermeho (Mem. R., m. 62 f.). 1300 Dermochii town assessed two marks for the Scotch wars (Pipe R.). 1583 The broken C. of Ballynacortie in Arlo, held by Pierce Grace (Des. R., 8). 1607 Ballynacortie C., with Darragh, &c., granted to Ed. Fitz Harys, along with Ballinagreanagh claimed as belonging to Downe Irish, a chapel of ease of the College of Kilmallock (Inq. Chan, 1A; Pat. R.; also

¹ Plate XIII.

² Capt. Robert Oliver, of Cloghnodfoy, registered his arms at Dublin, 1653; the senior branch of his descendants took the name Gascoigne. Another branch bears the old name at Tigroney, County Wicklow.

Proc. R.I.A., xxv. (c.), p. 425, Nos. 250, 254). 1655 A butt of an old C., Sir E. FitzHarys (C.S., xxv., p. 23).

Fabric.—Only a heap of stones remained in 1840 (O.S.L., 8, p. 88).

KNOCKLONG.

271. KNOCKLONG (40). Marked. The ancient Drom-damhghaire. Here were fought two battles: one legendary, *circa* 250, against Cormac mac Airt; one of some historic importance, *circa* 615, when Dioma, King of Thomond, gave a crushing defeat to the Connaughtmen who endeavoured to recover County Clare; this finally secured its possession to the Dalcais. The C. is of very late date, 1570-74. Pardons to T. Hurley, of Knocklongie (Fi. 1765, 2472). 1583 The C. held by Garret mac Thomas in Ballyneashe (Atheneasy) parish, in Cossherleroo (Des. R., 38B; Peyton, 237B). 1606-1635 Maur, son of T. Hurley, held it (Inq. Chan., 1B, 146). 1655 The ruined C., mills, two fairs, courts leet and baron, &c., Sir M. Hurley (C.S., xxv., p. 9; B.D., p. 29; D.S.A., 55). 1669 Confirmed to Cornet E. Cooper, of Markree¹ (Act Sett.).

Fabric.—Though attributed to the fourteenth century, it is two centuries later. It is 21 feet north and south, 18 feet wide, and 30 feet high; the walls, 6½ feet thick, with three stories, two large defaced windows in each of the south and east walls. There were four gables; one still has a plain chimney. The under vault has collapsed; and the stairs and cut-stones are removed (O.S.L., 8, p. 279; "Round about County Limerick," p. 32. For the Hurleys, see "Cork Journal of Archæology," 1905, vols. x.-xii.).

272. BALLINAHINCH, CLOHEEN, or DUNMOON (48). Site marked in first. 1300 Suit of T. de Molton and Matilda Botiller, his wife, about the free tenants in Dunmoun (Plea R., 42). 1540 The three seisreachs of Baile-na-hinnsi (Burke rental). 1576 Edm. FitzGibbon, the White Knight, is granted J. MacShehie's head-rent on Downemoane (Fi. 2873). 1590 The regrant of same (Fi. 5517). 1625 Maur. f. David Gibbon held Ballynehensy (Inq. Chan., 7). 1655 Dunmoone C., Gibon f. Gibon (C.S., xxv., p. 10), sold to Rob. Oliver (B.D., 92) as Doonmoon, *alias* Ballynahency, confirmed 1666 (Act Sett.).

Fabric.—A tower, 42 feet by 22½ feet; wall, 6 feet thick, 28 feet high. It has a spiral stair to the north gables, with chimneys to north

¹ A cousin of Lord Collooney; will, 1680; the family still continues.

and south, a square door of cut-stone to the west, and round-headed windows (O.S.L., 8, p. 281).

BALLINGARRY.

273. BALLINGARRY (49). Not marked. 1291 Garthegriffin (probably after Griffin de Rupe). 1302 Garthe in Natherlagh. 1291 suit of Alicia, widow of Griffin de Rupe, a mill, lands and turf there. 1655 Ballingarry C. in Coshlea (D.S.A., 53). A doubtful site. Strange to say, this place and its namesake in Connello have yielded the only two ogham stones hitherto found in County Limerick.

BALLYSCADDANE.

274. BALLYSCADDANE, RYVES CASTLE, or CASTLE JANE (41). Marked. The name probably from the Tipperary family of Scadan or Hareng. Beal atha na sgadún (O'Donovan). 1229 R. de Burgo gave seisin of Baliscadan to W. de Marisco (C.S.P.I.). 1657 Bealnescadane (D.S.A., 54, exp.). 1667 Confirmed to Jo. Ryves (Act Sett.). Ryves C. on "site of C. Jane" in new maps.¹ A most doubtful site.

BALLYLANDERS.

275. GLENNAHAGLISH (49). "Castle Field" and site marked. 1581 Ger. f. Edmund held Glanehaggylshoen C. (Inq. Exch., 11). 1608 Edm. MacGibbon, the White Knight, died seised of it (Inq. Chan., 17B). 1655 Glanehagilshy, a small stump of a C., N. Hall or Haly, of Tooreen, sold to J. and W. Reeves (C.S., xxv., p. 7; B.D., p. 92). 1667 Confirmed to J. Reeves (Act Sett.).

276. BALLYDUFF (57). Site marked. The D.S.A., 50, shows an unnamed C. in this parish; but no C. is mentioned in Ballinlondry Manor as held by Sir W. Fenton (C.S., xxv., p. 7).

GALBALLY.

277. GALBALLY OF AHERLOE (49). Site marked. 1285 Conor mac Dermot was fined £4 for burning the vill of Natherlach

¹ The Franks family was founded at this place by Capt. J. Franks, of Campsall, Yorkshire, in 1650; he had fought at Edgehill and Naseby. The Ryves family have a monument in the graveyard, put up in 1779 by W. Ryves, of Castle Jane, in memory of his grandfather, William (d. 1705), and his father Nicholas (d. 1714), "descendants of an antient family in Dorsetshire."

(C.S.P.I., p. 84). 1289 The King's grant to the Bishop of Emly of the manor of Natherlach. He recognises the custom on it that a convicted thief should pay 5 marks or be hanged, yet the Escheator only took 5s. (*Ib.*, p. 264). 1471 Gallbhaile Eatharlaigh or "English-town of Aherloe" (A.F.M.). 1569 Through Lord Ormonde's slackness Jas. f. Maurice preyed Arlagh, and burned the C., but forty of his men were slain (C.S.P.I., p. 82). 1577-1587 Pardons to Don. mac Crah, of Galbally, gent. (Fi. 3097, 5006), with his labourers and footmen. 1597 He was attainted, and the place granted to G. Sherlock (Fi. 6175). 1601 It was the muster-place of Carew's Irish contingent of 1300 foot and 120 horse from Cork in the war with the Sagan Earl. 1604 The Abbey and C. of Aherloe granted to Miles Roche and J. Burgat, of Fontstown (Pat. R.). 1653 Arth. Helsham paid for the house at Galbally £5 12s. 0*d.* Capt. M. Cusacke for repairing the "garrison," £26 12s. 0*d.* (Acct. R., 8, 13*B*). The walls of a very fine house or C. lately well fortified (D.S.A., 52).

Fabric.—The foundations, too much defaced to be measured, alone remained in 1840 (O.S.L., 9, p. 221).

278. DUNGROT (50). Site marked. The Galtees were originally known as Crotta cliach or Sliabh Crot (see notes on O'Huidhrin, ed. O'Donovan, 753). 1002 King Brian repaired Dungeroit fort (Wars G. and G.). 1578 Donegrot and Ardlaghe, possessions of Morrough O'Brien, of Cloughkeating, to G. Moore (Fi. 3317). 1587 Granted to Sir E. Fyton (Fi. 5032). 1604 The Manors and C.s of Galbally and Dungrott to Don., Earl of Thomond, as demised to M. Roche and J. Burgett (Pat. R.). 1611 Dungrott, a fair and a court of piepowder, to T. Cantwell (*Ib.*). 1655 J. Cantwell, Dungrott manor, C., grist-mill, tucking-mill, and courts leet and baron (C.S., xxv., p. 4; D.S.A., 50).

279. DUNTRILEAGUE (49). Not marked. Cormac Cass, King of Munster in the second century, says an early legend, was wounded in the head at the Battle of Knocksouna (see section 191, *supra*), where he defeated and slew Eochu Abhradruadh, King of Ulster. Cormac was brought to Duntriliag, where "a good dun" was constructed round a spring, with three pillars round his bed (whence the name "dun tri liag"); and, despite skilled medical attendance, he died, and was buried in a "cave" in the fort (Book of Lismore, "Colloquy"). 1002 King Brian strengthened Duntriliag (Wars G. and G.). 1346 Dundirleke (Gormanstown Register, p. 145 *d*). 1540 Burke of Castleconnell claimed a mark from "the small quarter of Duntriliag, whereon Baile na mona, Garrdha an langaigh (Garryenlanga), Baile

an bhighigh, Caislean Criaidh (Burke Rental). 1655 Downeter-league, the estate of Jo. Cantwell, sold to Hugh Massy (B.D., p. 90), confirmed 1666. His son, Hugh Massy, junior, describes its partial burning by the Irish; but he saved the outbuildings and several turrets (History of the Massy Family, 1890, p. 238). 1701 Hugh Massy made his will "being in danger of death, occasioned by a wound received from Edw. Moore, of Knockhorden" (Prerog., Dublin).¹

280. CASTLECREAGH (49). Site marked. 1540 Caislean criaidh in Duntriliag (Burke Rental). 1655 Castle creh, J. Cantwell, sold to Hugh Massy (B.D., p. 89). 1667 Confirmed to latter, then to W. Barraby, then the next year to J. Cantwell. It was afterwards a residence of the Bennetts, and had fallen into ruin by 1827 (Fitz-Gerald, i., p. 385).

KILBEHENY.

281. KILBEHENY (58). Marked in "Castle quarter." 1502 Donchad O'Brien died; he was lord of Pubblebrian and Aherloe to Coill beithne (A.F.M.). 1584 Mahowne mac Murrogho O'Brien owned Killinevehyne (Inq. Exch., 15). It then passed to Edm. mae Gibbon the White Knight, who, 1601, captured the Sugean Earl and brought him to his C. of Kilvenny (Pat. Hib., ii., p. 242). 1603 Sir Ric. Boyle was granted Kilvehoine or Kilvehenny ruinous C. with its pastures and mountains, late estate of Mahowin mae Muriagh O'Brien, attainted (Pat. R.). 1608 The White Knight held the C., mill, watercourse, and village at his death; his grandson died unmarried, 1611, when it passed to his sister, Lady Margaret Fenton (Inq. Chan., 17B). 1650 Oliver Cromwell took the C.: "I possessed a C. called Kilbenny, upon the edge of the County of Limerick, where I left 30 foot" (Letter to Lenthal: Carlyle, ed. 1846, vol. ii., p. 142). 1655 Held by Sir W. Fenton (C.S., xxv., p. 4).

Fabric.—The tower is 24 feet by 18 feet outside, five stories high; the lowest is vaulted; and the walls, 4½ feet thick. It is near the river Funshion and the border of Cork (O.S.L., p. 228; there is an account, with a view, in Journal R.S.A.I., vol. xv. (1880), p. 698).

¹ For the family of Massy, see note on section 110.

UNPLACED CASTLES.

282. CASTELLYNAM. Held by Jas. Fox, 1583, and named with Ballygrennane, Bulgadin, and Baggotstown (Des. R., 3b).
283. KNOCKFOOCKAN C., with Cloghie, and Thurihie in Ula and Cluggin, 1655 (Petty Map, 67). Perhaps intended for Ballyneety (No. 103, *supra*, p. 106).
284. DONESKEAGH C. 1569 Near Galbally or Kiltely (Carew, i., p. 389).
285. CASTELLAGHIE, County Limerick. Held by Theo. Bourke mac William, 1587 (Fi. 5069).
286. CASTLEMUES. County Limerick. Perhaps near Ballinity, held by W. F. Nicholas (Fi. 5950, 6461).
287. CASTLE CARRICKY. County Limerick (Inq. Exch., Eliz., No. 54, date lost).
288. CASTLE AMERY. 1272 The Manor of Castle Amory rents of betaghs and free tenants of Grannoth and Ballymelany, the rents of Kilinerath and the monks of Ohetheney (Owney), serjeantry-fees, ferry, and fishery (Pipe R.). 1277 Same, including Crannock, Ballymolan, and Kylneragh, late held by Walter de Burgo (*Ib.*, 8). 1296 Named with Kilarly, Balicorran, Donaghmore, Rathkeale, and various lands in County Limerick. Suit of Almerica de Bellofago and H. f. Philip f. Daniel about 100 acres in dower at Castle Amery in County Limerick, &c. (Plea R., xxv., Ed. I., m. 48).
289. CLOUBONGE IN ESGRENE. 1289 J. f. Galf has suit with Agnes de Valence about land and woods at Clouboyng in Esgren; and, later, it is found that the cause of the death of T. de Lesse was "that he fell from the wall of the C. of Clouboyn through a gust of wind" (Plea R.; P.R.O.I.).¹
290. PALLASBEG (15). Not marked. [Accidentally omitted from its place after TOUGH, No. 86, *supra*, p. 100.] *Circa* 1590 Pallisnetough (Pallesnetowghe) C., marked near Toghsegrene C. (Hardiman Map, 36 and 56). 1655 Pallisbeg C., Teig O'Bryne (C.S., xxx., p. 8). The place, but not the C., marked (D.S.A., 30).

¹ I owe this entry to Rev. St. John Seymour. The chapel of Cloubong, 1302, Cloughboyne, 1615, Cloghboen, 1607, or Cluanbong, 1437 (?) usually appears in the Visitations of the see of Emly. It is neither Clonbeg nor Ballynaelough, but is given with the Church of Gren, being in Esgrene; it is not Castleboynagh Wetheney, nor Kilboynan in Aherloe.

CORRIGENDA TO PART I.

Page 65, line 16—*for* “Henry III.”, *read* “Henry II.”

Section 50 (p. 91). Caherelly. Mr. Grene Barry suggests that the very involved (and in places nearly unintelligible) note in Fitz Gerald's History, vol. i., p. 2 (cited above), really refers to the time of the confiscation, 1651, and not to 1748, which should be in parentheses. Members of the Hynes family are still found at Caherelly.

Section 86 (p. 100). Tough is in TOUGH parish.

Section 102 (p. 106). 1590 Connigere, with a large house, shown (Hardiman, No. 56).

Page 108—*for* “65”, *read* “68”.

PLATES.

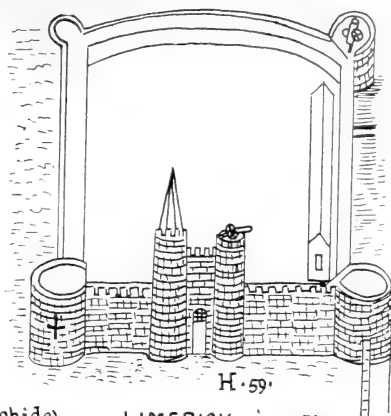
- XIII. Old views of the castles.—H., Hardiman maps, 1590. D. S., The Down Survey, 1655. T. D., Tho. Dyneley, 1680. T., Trustee maps, 1688–1703. “a” in Ballinagarde is marked by Dyneley to show the window from which the girl sprang.
- XIV. Adare, Ballygrennan, and Carrigogunnell Castles.
- XV. Plans of Adare and Carrigogunnell.



CASTLECONNELL



CASTLETOWN (Corcomohide).



LIMERICK circa 1590



BALLINAGARDE



CASTLETOWN (Kerry).



BALLYBRICKEEN



BALLYVORNEEN.



NEWCASTLE (near Limerick)



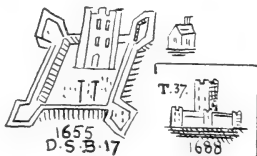
CLOGHNODFOY



KILLACOLLUM



BALLYCULHANE



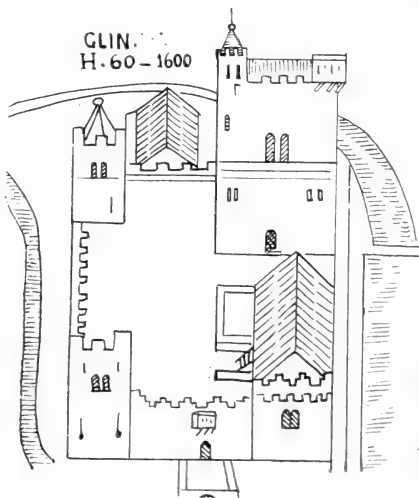
BALLYGLEAGHANE



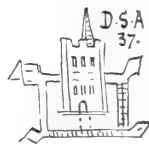
CAHERELLY



BALLYSTEEN



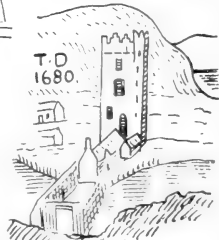
GLIN. H. 60 - 1600



RALEIGHSTOWN.



CARRIGUNNELL



LOUGHGUR

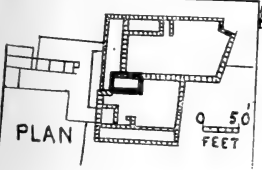




Adare Castle.

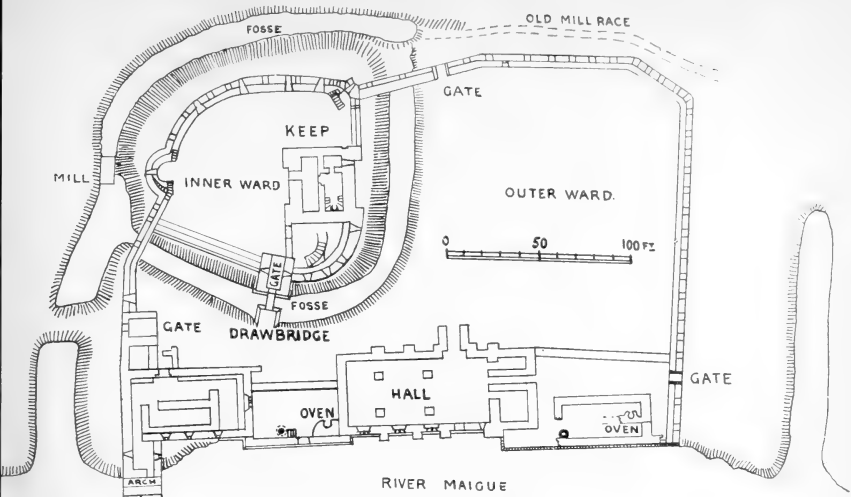


Ballygrennan Castle.

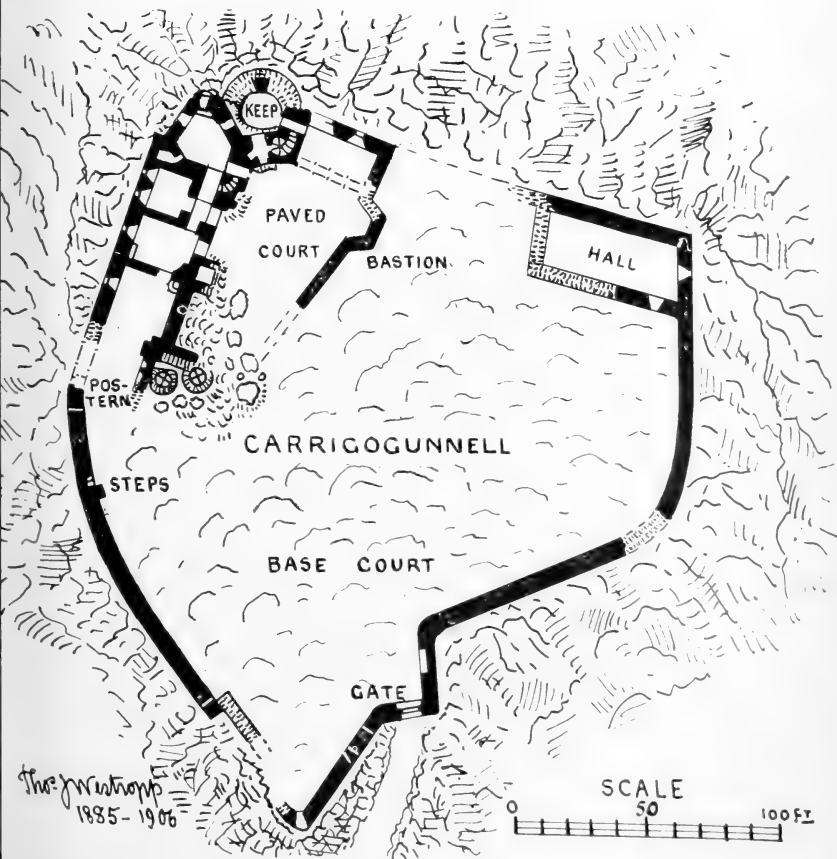


Carrigunnell Castle.





Plan of Adare Castle.



Plan of Carrigunnell Castle.

The Westropp
1835-1906



X.

THE ANCIENT CASTLES OF THE COUNTY OF LIMERICK
(WESTERN BARONIES).

BY THOMAS JOHNSON WESTROPP, M.A.

(PLATES XVI.—XVIII.).

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THE present portion of the Survey of the Ancient Castles of the County of Limerick¹ both concludes that paper and covers that part of the district most noted in later Irish history, the four parts of Connello,² the Desmonds' country. They still formed one barony in 1657, at the time of the great Surveys, and two, at least on the maps, till 1835. They are now divided, the western portions of Upper and Lower Connello being named Glenquin and Shanid after their chief castles, as the Irish divisions were named after the chief tribe, the Ui Chonaill Gabhra. Of the older sub-tribes, the Corcamuicheat are still commemorated in Corcamohide and the Fir Tamnaige in Mahoonagh, Magh Tamnaige or Tawnagh. Other old tribal divisions may still be accurately laid down from the Desmond Surveys of 1583-6. Pubblemynterquyllen, in Kilmeedy; Obaithin or O Meehan, in Rathronan, to the west of Ardagh; Olybane, in Clonagh; Drynan in

¹ Principal contractions used (see also *supra*, p. 74):—Ann., Annals; B.B.L., Black Book of Limerick; B.D., Book of Distribution; C., Castle; C.S.P.I., Calendars, Documents, and State Papers, Ireland; C.S., Civil Survey; D.S., Down Survey; Dep., Depositions; Des. R., Desmond Roll, 1583; Dub. Reg., Registry of Deeds; Fi., Fiants; Inq., Inquisitions (Chan., Chancery; Exch., Exchequer); Len., Lenihan's History; O.S., Ordnance Survey; P.R.O.I., Public Record Office of Ireland; R., Rolls; R.I.A., Royal Irish Academy; R.S.A.I., Royal Society of Antiquaries of Ireland, under successive names; S., Survey.

² As the Civil Survey of Connello, in all its divisions, is contained in vol. xxii., we only refer to the page in this section. The Exchequer Court in 1607 expected a new Survey of Munster (Equity Exch. Orders).

Kilbradran, and the districts named after the natural features of Cleanglas, or Clenlish, to the south, Slieve Luachra, to the west, and Glencorbraige, or Glin, to the north-west. We have already (p. 58) given the "Toghes" of Connello in 1583. We must, however, give a short-lived, but once important, set of divisions, the "Seignories," which prevailed from 1590 to 1610, and gradually fell into disuse. These were (1) Rock Barkeley,¹ the seignory and manor of Askeaton, under Sir Francis Berkeley, from Kenry to Lismakeery and Tomdeely. (2) Policastro, held by Sir W. Courtenay at Newcastle, Mayne, Ballyvaghan, Ballyegny, and Kilgulban. (3) Beawlie,² sold by Robert Stroude to Sir H. Oughtred; it reached from Cappagh to Clonshire. In the 36th Hardiman map (*circa* 1590) Ughtred is also shown as holding Glin, Monemoyhill, Gortnetubbred, Mayne, and Mahoonagh. (4) Mount Trenshard, held by W. Trenchard, from Corgrig and Foynes to Loghill and Rathnaseer. In 1590 it is shown as extending to Lisnacullia and Shanid. (5) Cullome's valley, which Robert Cullom held, round Ardagh, in 1611. (6) An unnamed Seignory of Sir W. Agar on the lower Maigne, but ill defined, 1611. (7) Knockbillingsley by Kilfinny to Dredhtarsna, Ballingarry, Amogan, Rathkeale, and Cloghanarold, held by H. Billingsley, 1588. The 1590 map includes in it Finnitterstown, Croagh, Kilfinny, Kilmacow, Lissamota, Garranboy, and Callow. This map also gives a Seignory held by (Laurence) Bostock, at Ballyglantan, Ballyhollan, and Kilcolan.

The ancient manors have in many cases been enumerated already (p. 66); but we may recall them as Askeaton or Iniskefty, 1199; Castellno or Newcastle, 1290; Ballingarry or Garthbibboys, 1318; Dunmoylan, 1299; Offargus, 1289; Aghness or Aughinish, 1580; Shanid, 1230; Corgraige, near Foynes, 1542; Portrynard, representative of Tara Luachra; and Glin or Glancorbry, 1222; Corcomoth, 1230; Ardagh, 1238; Rathkeale, 1252; and in 1287 Reyns, Moy Tawnagh or Mahoonagh, and Corcoithe (Gortcoygh, near Newcastle, 1586); Ardagh, 1293; Mayne, 1307; and Moychro or Croagh, 1297.

The great Geraldine house, the Lords of Desmond, held Connello from about 1230, ever growing in influence and insolence, over-

¹ Probably its latest survival is that in Grose's "Antiquities of Ireland," vol. ii., Plate xxxix., and p. 71, where the "Rockbarton Castle," under a view of Askeaton, 1793, is corrected to "Rockbarkley" in the text.

² It is shown near Castletown in Kenry, Hardiman Map 2. The only contemporary map of the Seignories, as such, known to me is No. 36 of same series, dating *circa* 1590.

whelming the old gentry and levying imposts on the Englishry, till (owing to the ill-conceived, ill-fought, ill-fated rebellion of the weak Earl, Gerald) it was broken up and given to strangers. Some of the "submerged" Irish and old English families re-appear and attain some local importance after the ruin of the Fitzgeralds; but, in the main, the "two very rich counties of Connello and Kenry" were divided and colonised by the new Englishry.

CONNELLO LOWER.

ASKEATON.

291. ASKEATON. Desmond's Castle (11). Marked. 902 The ancient Fort of Geibthine, which probably was named from the Gebtini, an ancient tribe in western Limerick, was claimed by the King of Cashel (Book of Rights). 1199 The C. of Easgepthine built (Ann. Inisfallen). It was an important C. and manor from the thirteenth to the sixteenth century. 1203 W. de Burgo was paid for the livery of Hinniskefty C. given to Hamo de Valoignes. 1318-1321 Ric. de Clare and his son and sister Matilda de Welle held it. In 1346 a list of the inhabitants is preserved. 1348 It was held by Maur. Earl of Desmond. 1367-1383 J. Maultravers granted it to his son, through whose death it lapsed to the Crown. 1383 The Earls of Desmond held it for two centuries. 1440-59 James Earl of Desmond built the great Hall of "Ardseitin."¹ 1452 The rental of Oconyll gives a detailed account of Iniskefty Manor and names the C. 1558 James Earl of Desmond buried in Askeaton Abbey. 1569 The Government negotiated to get the C. 1578 Malbie blockaded Gerald Earl of Desmond in the C., and burned the town and abbey. The Earl of Desmond rebelled. 1580 Pelham appeared before the C.; the garrison fled the following night, trying to blow it up, but doing little injury. 1589 The C. granted to Fra. Berkeley,² who, in 1598, was besieged in it for 247 days by the followers of the Sugan Earl; the siege was raised by Essex. 1615 Sir Fra. Berkeley died; his son Maurice succeeded, and died 1622, when his brother Henry and sisters Elizabeth Crofton and Gertrude Taylor eventually succeeded to the estates.

¹ See the "Abhallgort" of T. M. Neachtain, 1723, citing old records, "The Maullamore built." See *supra*, p. 70.

² See R.S.A.I., xxxiii., xxxiv.; and "Journal of Limerick Field Club," 1902. He was a scion of the Bruton Branch of the Barons of Berkeley.

1642 The C. was besieged and surrendered to the Confederates under P. Purecell. 1652 It was dismantled.¹ 1719 The Earl of Orrery endeavoured to get a grant so as to repair it for a garrison. (See paper R.S.A.I., xxxiii., pp. 25-153, 239; xxxiv., pp. 117-125.) The Desmond Roll (9) describes the C. in 1583 as "an excellent C., formerly a chief house of the late Earl of Desmond, in good repair, on a little island, on a rock, and surrounded on all sides by a rivulet. It contains two separate 'coorts' and one 'balne,' with divers strong buildings, . . . a large hall, a great vaulted room, with three cellars, . . . a triangular garden in which is a fish-pond," &c. (See also Peyton, 80B; C.S., p. 65; Deps. T.C.D., 387; Hist. of the Confederates, ii., pp. 51, 52. Paper T. J. Westropp, R.S.A.I., xxxiv., p. 118, for text of Desmond Roll, illustrations, and description.)²

Fabric.—The C. stands on a low island in the Deel, with a rocky plateau rising in the centre. At the north end of the latter is a lofty keep, 90 feet high, with two vaulted stories and an upper room. Its east side is down: a higher turret projects from its west face, with small vaulted rooms. A large wing of three stories with under vault adjoins to the south. A tower with an under vault and much broken stands at the south edge of the plateau; near it is the inner gateway. The gate of the outer ward is gone, it opened on the middle of the bridge; a battlemented wall runs round the north-west and west faces. At the latter is a handsome hall with several vaults underneath and a chapel to the south. Most of the outer walls are gone, but the "triangular garden" is traceable. (See O.S.L., 9, p. 454; R.S.A.I., vol. xxxiv., p. 111.)

292. THE SHORT CASTLE. Unknown. It is named in 1580 as such.³ Perhaps the "castello curtato," held, with lands at Askeaton, by the White Knight, 1596 (Inq. Exch., 32). 1588 "There is a little island near Asketton, now held by Jas. Nash. It is a parcell of the land of Asketton in which is a certain C. on the part lying to the west near the manor of A." mortgaged by the Earl to Nash. (Inq. Exch., 11; Cal., p. 245).

293. COURTBROWNE (11). Marked. 1581-3 Moriertagh mac

¹ The line of Castles retained for garrisons were—Galbally, Kilmallock, Lough Gur, Greenane, Ballyvoreneen, Brittas, and Tough along the east of the county, Castletown-Kerry, Ballingarry, Gortnatobrett, and Doonmoyle in the west (Account R., 6 E. 1-5).

² See Plates XVI., XVII., and XVIII.

³ See unpublished Geraldine Documents, R.S.A.I., vol. i., ser. iii. (1868), by Rev. Jas. Hayman, p. 356; and Rev. Jas. Graves, p. 459, *et seqq.*

Mortagh O'Sheehy held Brownsescourt or Brownestown (Des. R., 23; Inq. Exch., 11, 54; Fi. 3842); part of estate of dissolved Abbey of Keynsham.¹ It is shown as Courtbrowne C. (Peyton, p. 86; Hardiman Map 2). 1615 Maur. Berkeley let the C. to T. Martin, of Ballynash (Inq. Chan., 72B). 1642-52 Peter Maunsell² held Courte Browne, Athskeaton (Dep. T.C.D., p. 302). 1655 Owned by Mrs. Crofton and Lord Broghill (C.S., p. 65).

Fabric.—Some fragments of the "Court" remain.

294. BALLYNASH (10-11). Not marked. The Nash family is probably correct in deriving its descent from W. de Naas (1199), the grantee of Carnkital C. It was settled near Askeaton from at least 1346.³ In 1582, Ric. Nashe held Ballynashigg C. (Des. R., 23). 1590 C. Nash is marked (Hardiman 2). 1620 M. Berkeley settled it on his wife (Inq. Chan., 72B; and Deed P.R.O.I.). 1655 Held by Lord Brohill and Mrs. Crofton (C.S., p. 65).

295. BALLINORT (11). Not marked. 1590 Ballynorty granted to Fra. Barekley (Fi. 5469). He held it till his death. It had a "sufficient dwellinghouse on it" in 1611 (Inq. Chan., 6B). It passed to his sons Maurice, 1615, and Henry, 1623, and his daughter Gertrude Taylor. It was held by the Taylors till about 1760, when Catherine, sister of W. Taylor, and her husband, Hugh, second Baron Massy, succeeded to it. 1655 The map shows a castellated house and tower: Ballonort, Jo. Tailour (D.S.B., 11; C.S., p. 68).⁴ A doubtful site.

296. BALLYENGLAND OR CASTLE HEWSON (11). Marked. An appanage of Keynsham Abbey. 1581 T. England, held Englands-

¹ Keynsham tithed Courtbrown, Ballingarry, Ballestyen, Balleenglande or Englystowne, Balleneclohy, Balleen, Lisselotte, Kylmakho, Lysmykyre, Ballenmullen, Asketne, and Mackrevo, all in Conelagh, with rectories of Ballingarry, Askeaton, Kylmakho, Lysmakyre, and Egglys O Rossye. The tithes were granted to G. Baatman, a butcher, in 1570 (Fi. 1716).

² The early Maunsells were founded in Munster before 1250 by Walter, the fourth son of John Maunsell, Provost of Beverley. Walter was Governor of Oconath (Coonagh), and died 1318; his son Robert was sheriff of Tipperary, 1304. They appear in numerous thirteenth-century records, but the present Maunsells claim to have been established in it by T., grandson of T. Maunsell, of Chicheley, Bucks; 1609. See "History of Maunsell or Mansel," by Robert G. Maunsell (1903), pp. 11, 95.

³ Pat. R. The following held office in Limerick City. Bailiffs:—John, 1272; John, 1327, 1337, 1342; Richard, 1365. John was Mayor 1354, by which time they had settled at Askeaton (1346). See *infra*, Ballycullen.

⁴ For the Taylors, see R.S.A.I., vol. xxxiv., p. 131.

town, or Bally Inglanna, with a C. He was pardoned 1581 and 1590, and the place granted to him. His son Philip was hanged and attainted for rebellion. Philip had left a son Oliver, and Una Ny Donell Clancie was widow of T. England (Des. R., 23; Inq. Exch., 11, 49; Fi. 3842, 6464; Hardiman Map 36). 1612 It was mortgaged by Dowell mac Meale Murry (Inq. Chan., 9B). 1655 Lower Englandstown, Aldⁿ. N. Fanning¹; Upper, J. M^cRory and Brooke Bridges (C.S., p. 68; B.D., 22h). 1669 Granted to Ol. Lambert (Act Sett.) Bridges, about 1700, let the C. to the Hewsons.²

Fabric.—The C. stands on a crag 20 feet high. The remains consist of a peel tower, with outworks to the south, which are embodied in the modern house. The tower is 42 feet to 46 feet high, and measures 38 feet by 28 feet outside. The walls are 6½ feet thick, and have a batter for 11 feet above the ground and a footing course. The pointed south door leads to a staircase rising up the south and east walls. It is stone-roofed, 7 feet to 9 feet high, and 2½ feet wide, lit by three slits. The tower has another pointed door to the east, and three stories, under a vault, turned over wicker; they had wooden floors; the joist-holes remain. The rooms are 25 feet by 15 feet, and are lit by plain slits. The story over the vault was removed about 1750; it had a flower garden on top.³ Locally Ballynaglountha, “Town of the Glen”; *recte* Ballyinglanna.

TOMDEELY.

297. TOMDEELY (10). Marked. 1201 Tonndaily, held by the Church of Limerick (B.B.L., p. 14) 1223, and by H. Minetar, who regranted it with Ballymakett and Balidonelin to the Bishop (*Ib.*, p. 28). 1253 Agreement of the Bishop with Marg., widow of Tyrry de Kardyff, about Drumdel (*Ib.*, p. 12). 1289 Drimdel manor (Pipe R.); it was surveyed, 1336, for Bishop de Rupefort (Rental), and

¹ From 1252 a number of records relate to the Limerick Fanyns. Ric. and his wife Rose disseised Sibil Long of her pasture in Glenussin. An Inquis. as to Eva, widow of Ade Fanyn, and lands of Achdun, Bothele, &c. (Plea R., m. 3).

² For this family see “Memoirs of the House of Hewetson or Hewson,” 1901, p. 11. George Hewson held, 1662, Castle Hewson from Brooke Bridge. (He was grandson of George, one of the ’49 officers who had settled near Castlecomer.) George got a grant in fee, and married Catherine Peacock of Barntick, Clare; her sister, Agnes Southwell, of Eniscouch, had a daughter, who, on her marriage with Lord Wandesford, granted the Rathkeale property to Robert, son of George Hewson.

³ I have to thank Mr. J. B. Hewson for an admirable elevation and section of this castle, from which and his notes I derive the description.

was, with other lands, lost to the see, probably by the Desmonds' encroachments. 1580 T. fitzJ. Caume Fitzgerald held Tomgyly, as part of the lordship of Cleanlish, and the sons of Jas. Fitzgerald occupied the C. of Tom Whilley, or Tongwyll, with a fishery on the Shannon (Des. R., 32; Inq. Exch., 50, 53; Peyton, p. 234B). 1590 Granted to F. Barekeley (Fi. 5969). 1601 Inhabitants pardoned for supporting the Sугan Earl; Keaghan, O Synene, Dowlagh, and Gankagh named (Fi. 6566). 1615 Drumdely, an auntient mannor of the bishops, held by Morris f. Tho., at a rent of 5 marks, or £2 13s. 4d. It had been so long leased and neglected that the rent was only payable at pleasure (Visitatio Regalis, 1615, for Limerick Diocese). 1655 Lord Brohill held Tomdily (C.S., p. 71).

Fabric.—A large, low tower, 72 feet long and 40 feet wide. No features of interest (O.S.L., 9, p. 446).

MORGANS.

298. MORGANS (10). Not marked. A doubtful site; perhaps really Dysert (see 384, *infra*). 1201 Disuirt Murdewar (B.B.L., p. 14). 1410 Disert Muirdeabhair or Morgans (Vis. O'Dea). 1587 Sir J. of Desmond held Morgans in fee with a ruinous C. (Inq. Exch., 32). 1603 Grant to Ric. Boyle, of the town of Morgans, or Morergans¹ with an old stone C. and bawne, late of J. Fitzgerald, Knight, attainted (Pat. R.) Boyle's son, Lord Brohill, held Morgans, on the river Shannon (C.S., p. 72).

LISMAKEERY.

299. LISMAKEERY² (19). Marked. An appanage of Keynsham. 1302 Lismaceyre. 1582 Pardon to W. Lacye, of Lysmakire (Fi. 3842). Jas. Reough Lacy held the C. (Des. R., 72; Peyton, p. 89). Granted to F. Berkeley, who leased it to Edm. Drew³ (Fi. 5242). Called Lisvikerry, Lismackerry, Lismacyrrye (1591 Valor and Inq. Chan., ix., 74). 1615 Maur. Berkeley settled it on his wife with reversion to his brother Henry and their sisters (Deeds, P.R.O.I., p. 58).

¹ Perhaps Barrigone, near Dysert Castle.

² Compare name with Ballymakeery (Fi. 5242), held 1588, by R. Stephenson. There was a family named Machery in Iverros, 1298, which disseised Lucia Vincent of a message there (Plea R., 13 m. 20).

³ First Provost of Askeaton, 1612. The Drogo or Drew family, represented in Clare and Limerick by the lines of Drewsborough and Drewscourt, claim descent from the Drews, of Drewsliffe, Hayne, and Sharpham, Devon, through Francis Drew, a captain in army of Elizabeth.

1629 Edm. Fitzgerald, of Lissakaire C., *alias* Tryenlassamacdirry, or Garrinp'son; he had enfeoffed Edm. Lacy in 1609 (Inq. Chan., ix., 74). 1655 The ruined C. held by Lord Brohill¹ (C.S., xxii., p. 71). It was traditionally regarded as a de Lacy C. in 1840.

Fabric.—It is quite defaced; the south and west walls 20 feet high, and barely 12 feet of the other sides (O.S.L., 9, p. 451).

300. BALLYCULLEN (19). Not marked. 1289 John and Roger f. David Belcoe held parts of Balycollan; Ad. Flemeng unjustly dis-seised the lands (Plea R., 14., m. 11). Maur. and Eva de Lees were warranted in the vill. of Ballyculan (Plea R., 13, m. 19). 1583 Jas. Oge Nashe held the C. (Des. R., 20B, 21). David f. J. "roa" Nash held it and Ballylynan in fee when he joined Desmond's rebellion; he was slain, 1581; his son John (or Jas.) held it 1584 (Peyton, p. 90; Inq. Exch., Jas. I., 28). 1610 James held it at his death, and his son John succeeded. It paid head rent to the Berkeleys (Inq. Chan. Car. I. 103). 1655 Lord Brohill held Balliculline C. and a ruined house and bawn near it (C.S., p. 69). The Nash family still own it.

Fabric.—The lower part, a wall, with battered base, is embodied in the house, which was built out of the C. in about 1740. I am told that there is a curious cellar with wooden pillars.

301. BALLYCLOGH (19). Not marked. 1336 Ballynaclochy, in Cluaincheur manor, held by Bishop de Rupefort. 1583 E. oge Lacy, of Knockpatrick, held C. and fee of Ballynecloughy in Toghe Lismakery. C. broken and ruinous, with a waste croft or garden (Des. R., 71B; Peyton, p. 89b; Inq. Exch., 11). 1587 It was granted to F. Trenchard (Fi. 5078; Inq. Chan., 5B). 1655 N. Lylles held it (C.S., p. 69).

302. MILLTOWN (20). Marked. A doubtful site; perhaps Ballenmollen, near Asketne, tithes held by late Abbey of Keynsham (Fi. 1716). 1655 Sir F. Slingsby held the south and T. Lacie the north part of Milltown (C.S., p. 70). No C. mentioned.

Fabric.—A fragment of an old house, with a tall chimney, stands in a large ring wall near the Deel.

NANTINAN.

303. CALLOW (20). Not marked. 1452 Calouu, in Innyskefty (Rental). 1584 Ric. London held Callowghe C., Doghillmore and beg (Doheil), Ballyvorrishin, and Ballyngarran, in Tough Nantinan, in fee

¹ His father, Sir R. Boyle, had been granted it by patent 1603, but it was held by the Berkeleys at same time.

(Peyton, p. 76; Inq. Exch., 14, 16, 54). 1588 On his attainder it was granted to H. Billingsley (Fi. 5171). 1600 J. FitzGarrett, of Calough, pardoned (Fi. 6452). 1611-23 Held by Sir J. Dowdall. The C. was a sufficient residence; it had been granted by Billingsley to W. Wadding (Inq. Chan., 15A, 6B). 1641 Callow C. (Dep., 437). 1655 It and Ballymurrishreen held by Fra. Borstye (C.S., p. 62).

304. ARDGOWLEMORE (20 and 29). Not marked. 1289 Various suits of the tenants of Ardougouel. Laur. and T. Fleming (Plea R., 13, m. 9), Adam Naish, and Steph. Kyvernoc (m. 14). 1296-7 Plea of Ric. and Johan le Joefne against Ric. and Alice Motyng¹ about Ardougouhil (Plea R., 34, m. 63). 1586 The C. and mill on the Dylebegg River held by Maur. Lee, the Earl's doctor (Peyton, 78, 179); he had pardon, 1577 (Fi. 3086), and still held the hamlet of Argoole, with Argoolebeg and Boolliglass, at his death, 1588. His son Edm. married, and aged 28, succeeded (Inq. Exch., 21). 1609, Feb. A case was tried in the Exchequer between Edm. Ley, of Ardgowley, and Geo. Courtney, the late sheriff, demurring to an Inquisition of 1590 finding for Crown on death of Morrice Ley. Order that no process be taken against Edmund (Equity Exchr., 1608-9). 1655 His descendant Maur. Legy held both Ardgowles, which were granted to W. Godolphin and Brook Bridges (B.D., p. 22f; C.S., p. 63). It was probably near the present bridge and mill.

305. ARDGOWLEBEGG (20). Not marked. 1586 Ardgowlabegg C. See last section. 1614 The estate of Edm. Lacy, attainted, granted to N. Weston (Pat. R.). 1655 See above.

306. STONEVILLE (20). "Tower" marked on new maps. It seems to correspond to ffarrenrye (C.S., p. 62). It may be the C. of Ardgowlebegg, or that of Cloghatrida, which townlands adjoin (see 316, *infra*).

Fabric.—The C. is a featureless and modernised building noted in 1840 (O.S.L., 8, p. 11), but not on old map.

307. RATHNASEER (29). Marked. 1201 Rathnaseir, an ancient parish, now surrounded by Rathkeale, but joined to Nantinan. 1220 Held by Roger Waspayl (B.B.L., pp. 14, 105). It was held by the Fitzgeralds; their pedigree is extant (R.S.A.I., vol. xv., p. 436). It runs—Shanemore, of Rath na Saor, Gerald, Henry, James, Henry-an-forso, and Philip. 1580 Ger. f. Tho., of Rathneseir, joined Desmond's rebellion (Inq. Exch., 54). 1588 Ratnuseer or Farrentegin C., late of Earl of Desmond, granted to Billingsley (Fi. 5171). 1611

¹ Whence, perhaps, the Keppathlynmotyng of 1452 in Innyskefty (Rental).

T. macGerralde, evicted from the C. by Rob. Cullum, assignee of W. Trenchard. 1615 The manor of Rathnusire claimed by Bishop Bernard Adams from Sir H. Outrad (Vis. Reg.). 1637 Jas. Purcell, of Croagh, died seized of it (Inq. Chan., viii., p. 241). 1657 T. Fitzgerald held it (C.S., p. 77; B.D., 22F). Traditionally a Desmond C.

Fabric.—It has a vaulted under story 14 feet by 11 feet inside; the walls, $6\frac{1}{2}$ feet thick, and 35 feet high.

CAPPAGH.

308. CAPPAGH (20). Marked. 1201 Kyllmacluana held by the Church of Limerick (B.B.L., p. 14). 1302 Wasted by war. 1336 Keappach-Kylm^ecluana held by Bishop de Rupefort (Rental), and by "John Tho. Philip,"¹ Knight of Glin, before 1541 under the Bishops (B.B.L., p. 144). 1578 His C., or manor, of Keppagh granted to the Lord President, Sir W. Drurye (Fi. 3277). 1583 Kyppagh, or Cappagh, the C. and vill. of Kylene-Cappagh, or Carrenbegg, late of T. macRuddery, Knight of the Valley; Walter Boorke, who held the C. was attainted; Ullig Browne next held it (Des. R., 41, 71B; Peyton, 231B; Inq. Exch., 10, 11; Carew i., 435). 1587 The lands, "long waste and unpeopled," granted to Gilbert Gerrard, and then to J. Stroude (Carew i., 449). 1591 Grant to W. Carter of the "ancient C., with a barbican ruined on the S.," and 320 acres (Fi. 5717). 1615 The Bishop claimed Knightes Kepagh, held by Oliver Stephenson (Vis. Reg.). 1629 Edm. Southwell conveyed it to Ric. Earl of Cork (Pat. R.). 1642 The C. blockaded by the Confederates, and surrendered by F. Morton. 1655 Cappagh with a great bawn, a ruined C., and a quarry, held by N. Dowdall (C.S., p. 53).

*Fabric.*²—The north side of a strong tower, with an inner and outer enclosure; the last with turrets at the eastern angles, and fenced by low crags to the west. The keep is about 70 feet high, and is 41 feet by 30 feet over all. It is five stories high; the third and fourth resting on vaults. The windows very neat, and dating from about 1460–80. The eastern end contained the stairs, to the south-east, the porch, and small vaulted rooms. Their vaults on a level with those of the main wing. The inner court is 57 feet square, the outer 115 feet north and south; 78 feet east and west; the west walls

¹ Perhaps a mistake for Tho. f. Philip f. John, 1496, Knight of Glin. The page is much defaced.

² See views, details, and plan, Plates XVI. and XVIII.

abutting on the rocks. The north-east bastion is round, the walls near it about 50 feet high; the south-east turret had a gate; the walls rarely exceed $3\frac{1}{2}$ feet thick. Legend in 1827 said that Fitzgerald, of Ballyglehane C., gave the use of Cappagh to his brother; but, urged by his wife, reclaimed it. The brother blew up the latter C. the day before its surrender.¹

DOONDONNELL.

309. CLOGHNAROLD OF DOONDONNELL (29). Not marked. 1220-37 The C. of Robert of Doononnell,² (B.B.L., p. 75). 1275 Held by Emmeline de Lacy (Pipe R.). 1389 The custody of Drunkyn, Robert's C., Dundawenyll, and Ballylogh, estates of Ric. Harold,³ disturbed by Katherine, his widow (Mem. R.). 1452 Castro Robti Dondownyll, vocat Harolt Castel (Rental Oconyll), and held under the Earls of Desmond. 1583 Rory mac Shehie of Ballynrogie held Ballyalenan, Ballyminteryroerke,⁴ the C. of Robert $\frac{1}{2}$ Downedwnill, called Clogh an Arulta, when he was slain in Desmond's rebellion (Des. R., 20; Peyton, 83; Inq. Chan., 6B). 1588 Clohonoralte C., late of David Encorry (Fitz gibbon),⁵ granted to Billingsly (Fi. 5171; Inq. Exch. James I., 7, 8). 1612 Granted to Capt. G. Blundell (Pat. R.). 1623 Held by Sir J. Dowdall (Inq. Chan., 15A.). 1642 Besieged by Ol. Stephenson, Morris Harbert, and others for six months, and surrendered to the Confederates (Dep., 344). 1655 Held by L^t.-Col. Piggott (C.S., p. 60).

Fabric.—Fragments of walls, called the "Dun" or "C.," stood near the church in 1840 (O.S.L., 8, p. 168).

¹ Fitzgerald, i., p. 359; he makes the inner garth 105 feet by 72 feet; my measurements are as in text.

² Many suits of this family appear in the Plea Rolls of 1252. John, W., Regin, and Robert de Dundonenold, appear in one suit; W. and J. in another, about Clennomer, Killeneran, Coleskilling, and Cowaby, which Lau. de D. held. Robert de D. gives 20 shillings to the King for an agreement. In another, 1289, T. Dondonald is found to have been slain by Donechad M'ohoy, who fled to Thomond (Plea R., 13, m. 29).

³ A family of reputed Ostman origin. J. Harold was sheriff of Co. Limerick, 1296, and the Harolds often appear in the lists of city officers—bailiffs from 1423, and mayors from 1498.

⁴ A settlement evidently of a "muintier," or family of O'Rourke.

⁵ David Gibbon, Encorry, Lord of the great wood (Kilmore), held extensive lands in Cork and Castlenikyllagh, in Toghe de Kylmore, on the borders of Limerick; he was attainted of high treason (Des. R., 88).

CLONAGH.¹

310. LISNACULLIA (28). Marked. 1289 Lysnekylle. Liosnacoille C. was built by the Mac Sheehies, who were settled there by Jas. Earl of Desmond after 1420 (Fitzgerald, i., p. 357). 1580 It was held by T. Caune, f. John, Geraldine at Desmond's rebellion; the C. was part of the manor of Cleanlish; and by his son Maurice, in 1596 (Des. R., 73B; Peyton, p. 108; Fi. 5998; Inq. Exch., 11, 12, 20, 53, 54), granted to W. Trenchard; his heirs had a lawsuit with Maur. f. Tho. and Jas. Miagh, about Lishenekilly C. 1593 (Fi. 5078; Inq. Exch., 41). 1620 T. Gerald enfeoffed D. O'Brien in the C. (Inq. Chan., 55B). 1655 Sir E. Fitzgerald held it (B.D., 22k; C.S., p. 76). 1668 Confirmed to N. Browne (Act Sett.). It was called "Woodfort" in 1840 (O.S.L., 9, p. 164).

Fabric.—A peel tower; the main wing is three stories high, two under a vault, and is 35 feet by 20 feet 9 inches inside; the walls 5 feet thick. A square turret, with a spiral stair to the south-east, and vaulted rooms, 11 feet 3 inches by 7 feet 3 inches. It is four stories high, standing at the north-east corner. The top room is large and well built, with a cross-passage under its floor. It is reached by a detached stair, over a skew-arch, from the main building. A court lies to the south-east, with a turret two stories high, the lower vaulted at the south-east. The windows date about 1460–80. A stream flows near it.²

311. BALLYEGNYBEG (28). Marked. 1452 Ballyeghn', a Desmond property (Rental). 1583 Peter Wall held Ballyegnybegg in Farrensesseragh, or Ballyegna; he was executed for joining Desmond in rebellion (Des. R., 69B; Peyton, 251; Inq. Exch., 11). 1587 It was granted to Ol. Stephenson as the late estate of Ulick Wall, "The Falltach" (Fi. 5242). 1598 F. Trenchard held Ballyeaghybegg, and Ballyeghane C., on his death (Inq. Chan., 5A., 35B). 1612 Sir F. Berkeley held it (Vis. Reg., p. 368). 1655 Balleogun, held by J. Hurley (B.D., 22R, Hurllie, of Ballioginn, a small C. (C.S., p. 77). 1665 Granted to Duke of York.

Fabric.—A low tower, fairly perfect, 25 feet high, with spiral stair to top (O.S.L., 9, p. 166).

¹ The ancient Offargus. The manor is given in the Rental of Oconyl, in 1452. It lay in Kilsconnell and Clonagh. Plea R., 14, m. 1, gives in 1289, in the suits of Jas. Keating and W. de Dundonenold, Duplys Kyldunyld, Kylkeran, and Lysnekylle, as in Offergus.

² See Plates XVI. and XVII. for views.

312. REYNS OR KILSCANNELL (28). Not marked. An early manor. 1282 Suit whether Peter f. Hen. de Lexynton dowered Leticia, his wife, with Kils kannuyl and Balilathnan (Mem. R., 41). 1287 Reyms manor held by T. de Clare at his death (C.S.P.I.). 1583 The manor and ruinous C. of Clonaguillen or Kyllskannell (Des. R., 27). 1655 Kils cannell C. shown (D.S.B., 4).

RATHKEALE.

313. RATHKEALE (29). Marked. 902 Rathguala fort (Book of Rights). 1223 Rathgeyl held by H. Waspayl; 1240 by Roger Waspayl (B.B.L., p. 74) till after 1251, as the demesne of Radgucl, which had been granted by him to J. Mautravers (C.S.P.I., No. 1778). 1308 The escheator answers nothing for Ratheayl, for it was delivered to Pat., son and heir of T. Smythe (Pipe R.). 1378 Sir J. Mautravers devised it to J. Mautravers, "le Cosyn," at whose decease it reverted to former (Mem. R., 43). When claimed by the Crown, it was stated that Rob. and Alienor Rorts were cousins to Mautravers, who, it was pleaded, held it from the Countess of Desmond, as of the manor of Iniskyfty, but in 1380 it was seized for the Crown from J. Arundel, heir of Mautravers (Mem. R., 28, &c.). It was held by the Desmonds. 1487 The Earl of Desmond was treacherously slain by his own people in Rathgaela (Ann. F.M.). The C. is said to have been built by the Earls; it was, in 1579, burned by Malbie in his advance on Askeaton after the Battle of Monasteranenagh (C.S.P.I.), March, 1580. Pelham, in his march on Glin, met Ormonde near the bridge of Rathkell, as the river was impassable in winter. Malbie has garrisoned the C. near the bridge, but Desmond had broken the latter on a dark night the week before. Pelham repaired it, burned the C., and marched to Newcastle, driving its inhabitants to Sliulogher, and camped near C. Shanet (Carew MSS. ii., p. 236). 1583 Desmond had held Rathkeale in Olybane, with "courts-baron, pipowdere, profits on ameracements, bloodshed, affrays, abuses, and misdemeanours" (Des. R., 28). 1586 Maur. mac Edm. Hubbert¹ held the C. (Peyton,

¹ If, as the Inquisitions suggest, the Hubberts or Herberts, of Rathkeale, and those of Ballyhybard, are the same family (Inq., 1584, Exchr., 10, p. 219), then they are old Englishry. Henry V. appointed H. Hubbert to inquire into seditious in Co. Limerick, 1415 (Close R.). Others, however, allege that the Rathkeale family derives from Edm., of Cahermehill, fourth son of Sir Edm., of Poolcastle, son of the Earl of Pembroke. See Lenihan ("Limerick," p. 334), with inaccurate dates; he also confuses them with the Southwells.

79B). Gerald and Ulig, his sons, had been pardoned in 1581 (Fi. 3842). It continued in the hands of the Herberts. 1605 Edm. Hubbert pleads that his father, Morris f. Edm., left Rathkeale Abbey and Cahirmehill to his younger son Garrett, so he (Edm.) is not liable for arrears (Rev. Exch. Orders, vol. i., p. 57). Sir J. Dowdall was granted a Thursday market at the high cross of Rathkeale, in the manor of Knockbillingsley (Pat. R.). Edmund Hubbert had a son, Morish, who married M. Bourke, of Ballinagard, widow of Don. Canny, of Drombanny, and had issue Garrett, m. to Ellen Fitzgerald, of Caherassa, with Morris, James, and several daughters (Fun. Ent., 1638, p. 615). 1642 A number of the English fled to the Chancellor's C. of Rathkeale about Candlemas, and were besieged by M. Harbert, who "raised a fort or sconce,"¹ and "offended the besieged." He kept another C. half a mile away till the English surrendered (Deps. 264, 345, 346). 1655 Morrish Harbert held the C., bridge, millseats, and tenements (C.S., p. 54). 1669 Granted to Ol. Lambert.

Fabric.—The low, broken, vaulted basement, and the north wall, two stories higher, with a spiral stair, remain.

314. CASTLE MATTRESS (29). Marked. 1487 James ninth Earl of Desmond, murdered by his servants in Caslan Mattras (Len., p. 68), called Courtmattress, 1488. 1580 N. f. William held Matrascourte (Matrackscourt) C. on the Deel, on Nekraghe, in Rathkealy (Peyton, 164; Inq. Exch., 10, 11). 1588 Granted to Billingsley (Fi. 5171, Carew i., p. 450); and 1608 to Sir J. Dowdall, of Pilltown, with the Courts-Barron, and the Abbey (Pat. R. and Inq. Chan., 15A). 1616 Held by Edm. Southwell (Exchr. Lease, 32). 1642 Besieged by M. Herbert, and surrendered (Dep., 1903). 1655 C. Matrix, or Court Matrix, with Inishgousee, the C., orchard, and grist mill on the Deel. Edm. Southwell² (C.S., p. 58). Traditionally a Desmond C.

Fabric.—It was repaired by J. Browne before 1840. The tower is 44 feet by 35½ feet outside, 60 feet high, with walls 7 feet thick. It is battlemented, and has four stories (O.S.L., 8, p. 186).

¹ An old term notable from its use in the renaming of Dun Ceithirn as "The Giant's Sconce."

² The family was formerly of Suell, or Suthwell, Nottingham, lords of its manor from 1260. Rob. Suthwell, Serjeant-of-Law, died 1514; his grandson, J. Suthwell, of Barham, migrated to Ireland, and two of his sons, Ric., of Singland, and Edmund, of Castlematrix, settled in Limerick. John, fifth son of the latter, was sheriff, 1654, and baronet, 1662. His monument at Rathkeale calls him "of Barham Hall," Suffolk. His descendants were created Barons, 1717; and Viscounts Southwell, of Castlemattress, 1766.

315. THE GLEBE CASTLE, Castlematrix (29). Marked. A tower 21 feet by 13 feet inside, 40 feet high, walls 6 feet thick. It has four stories without vaults (O.S.L., 8., p. 186).

316. CLOGHATRIDA (20). Not marked. 1577 Edm. Wale, of Clogcadredamickeoris, died; his son Ric. succeeded, being of full age, and married (Inq. Exch., 24). 1583 Ric. Wale, Cloughtread, or Cloghkatred, in Nantinan (Des. R., 23; Peyton, p. 79; Inq. Exch., 54). He got pardon (Fi. 4623). 1588 His estate granted to Billingsley (Fi. 5171). 1641 Ric. Southwell held the bawn and C. of Cloghtreada (Inq. Chan. viii., 258). Next year M. Herbert, of Racele, plundered Kloughkottred and reaped T. Southwell's crops (Dep. 268). 1655 Cloghtreday, in Rathkeale, Capt. T. Southwell (C.S., p. 58). 1672 Rob. Peacock,¹ of Cloghatrady, gave evidence as to Capt. T. Walcott's alleged attempt to seize Limerick C. The place must not be confused with Clogh, or Cloghatredboy, in Croagh (*infra*, 324).

317. KYLETAUN (2029). Not marked. 1376 On the death of Sir J. Lamplo, Norragh, Co. Lym, lapsed to the Crown (Mem. R., 68). 1621 Keiltanes, or Castlemacmorris, or Norroes, C., stone house, messuage, &c., enfeoffed to Morrish Herbert, of Rathkeile (Inq. Chan., 204).

318. DROMARD OF MOUNTBROWNE (29). Marked. 1583 The ancient C. of Dromarde or Droomearde, in Toghe Olybane, forfeited by Ric. f. William. 1588 Granted to Billingsley (Des. R., 29; Peyton, 70B; Fi. 5171; Carew i., p. 450). 1608-28 Granted to Sir J. Dowdall (Inq. Chan., 15A). 1655 Held by N. Dowdall (C.S., p. 58).

319. BALLYALLINAN (29). Marked. It is said to have been built on the Deel by the O'Hallinans² (Fitz Gerald, i., p. 357). 1282 Suit whether Peter de Lexynton dowered his wife with land at Ballilathnan. 1569 Balleallenay C. surrendered to English (C.S.P.I.). 1580 Eugene mac Edm. oge Shehie held it when slain in rebellion;

¹ The Peacocks, baronets, were descendants of a George Peacock, 1700, who died at Kilpeacon, being third son of Murmaduke Peacock, of York. Simon Peacock, of York, 1657, had married a sister of Mountifort Westropp, who settled in Limerick. George appears to have been nephew of George Peacock, of Graige (Greenmount), Limerick, who, in 1688, by a nuncupative will (Limerick Registry), left his estates to his nephews, George and James; he adds, "If it shall please God that the times continue peaceable." His forebodings were verified before the year ended. See also will of Ric. Peacock (Prerog.), 1693.

² A mere guess from the name.

Rorie mac Shihy was pardoned; and J. Wolf enfeoffed him in Bally-winterywork. Shehy's wife, Johanna Bourke, is named, and their son Morgho, who succeeded in 1591 (Inq. Exch., 16, p. 285; Inq. Chan., Car. I., 66; Fi. 3842; Des. R., 30B). 1600 Dermond O'Connor went to Rory Mac Shihy, at Ballyallinan, after his capture of the Sugan Earl; the latter's followers besieged O'Connor, and forced him to surrender (Pac. Hib. i., pp. 99-103). 1604 Granted to Sir H. Brounker (Inq. Chan., 66). 1655 Held by Elen Butler (C.S., p. 59). 1675 Part confirmed to Roger Dawges (Act Sett.).

Fabric.—A tower 35 feet by 16½ feet, 55 feet high, walls 7 feet thick. It has five stories; the second and third vaulted. The top ruined (O.S.L., 8, p. 189).

320. GORTNEGWORRA C. 1586, Unknown, perhaps Matrascourte, as in that townland (Peyton, 164B).

321. BALLYWILLIAM (29). Not marked. 1584 J. Wolfe, of Williamstown, enfeoffed Reirin mac Shehie, of Ballyallynan, in Bally-winterywork, in mortgage for fifty-three milch cows (Inq. Exch., 16). Pat. f. J. Woolphe held Ballywillin C., in Rathekealy (Peyton, 70; Inq. Exch., 16). 1663 Sir T. Southwell rented it (Rev. Exch. Orders, p. 92).

Fabric.—In 1840 a heap of fallen stones remained (O.S.L., 8, p. 191).

CROAGH.

322. CROAGH (20). Not marked. 1289 Hugh Purcell granted woods and turf out of Moychro, or Maynchro, or Croagh, to Ger. the Bishop (B.B.L., xv.), and was in 1297 granted free warren there (C.S.P.I.). 1305 The manor of Croch taken by Crown (Plea R., 191). 1317 Suit of Jordan Coterel, or Cotel, and Rob. and Isolda Lovelynych, about Crogh (Plea R., 122; Mem. R., m. 14). 1318 T. f. Hugh Purcell had suit with Maur., Prior of St. Mary's, Rathgell, for violence done by latter at Moyero (*Ib.*, m. 47). It remained in possession of the Purcells (see 160, *supra*). 1350 Walter Purcell also held Kilfinnane (Pipe R.). The descent is fully preserved from 1480; Thomas Purcell; Patrick; Pierce; 1530;¹ Edmond, 1567; Piers, 1568-1618; James, m. Jane Blayney, dau. of Sir F. Berkeley, and his brothers General Patrick, the Confederate leader, Edm., Tho., and Ric. ("Anglo-Irish families," Ulster's Office, p. 51; Fun. Ent. 1630,

¹ Piers had a second son, Patrick, father of Ric., of Ballynacarriggie, who married More Mac Namara, of Knappoge, Clare. His son, Pat., married Cath., dau. of M. Herbert, of Rakele (Fun. Ent., 1630, pp. 185, 240).

pp. 185, 240). 1567 Edm. and, 1576, Peter got pardon (Fi. 1050, 2783). 1591 T. f. J. Mac Ruddery, Knight of Glin, held the hamlet and lands (save those of Peter Purcell) at Croaghneburgage, the C. called Castell fferon (Inq. Exch., 32; Peyton, 206B). 1611 Grant to Edm. Purcell to form a manor at Croagh, with courts Leet and Baron, free warren, &c. (Pat. R., Inq. Chan., 16B). He died 1618. 1637 James died seized of C. of Crowagh, or Moycrowagh; his father, Patrick, succeeded, and held of the heirs of Hugh Purcell, as part of the manor of Corek Iheny, granted by Jas. I. in 1617 to Edm.; dower claimed, 1640, by Cecilia, or Shihy ni Shihy, widow of Pierce, and Frances Barkly, widow of James (Inq. Chan., viii., 241). 1641 Lieut. Pat. Purcell took leading part in civil war, and was a brave and humane officer. 1655 Croaghstown burgess and Spittle Land held by T. Browne, of Hospital, Croagh neburgess on river Grivagh; the manor subject to Mrs. Frances Purcell's (Barkley's) jointure; Croaghstown with C., courts Leet and Baron, a highway, a small brook, a great church, &c. (C.S., pp. 48-51; B.D., 21). 1669 Confirmed to Lord Kingston; Capt. T. W. Walcott¹ held land there (Act Sett.). 1692 Rob. Purcell died leaving Croagh to his wife, Mary, for life, entailed on his cousin, J. Purcell, of Ballinvirry (Prerog.). 1726 J. Walcott settled it on Edm. Browne, of Ballyslattery, Clare, on the latter marrying Walcott's cousin, Jane Westropp, of Attyflin (Dub. Reg., 54, p. 399).

323. BALLINCURRA (20). A doubtful site. It may be the C. of Ballyncurry, late property of J. f. W. Lacy, granted to G. Thornton, 1587 (Inq. Exch., 13), and confirmed with Downemane to T. Thornton, 1625 (Pat. R.). If not, the records may refer to Ballinacurra C., near Limerick; but the latter was held in 1624 by Sir W. Parsons.

324. CLOGH, EAST (20). Marked. 1583 T. Mac Rudderye owned Clohokotredboy, in Toghe Croghe. 1586 It and Kiltennan were held by Maur. mac Edm. Sarsfield² (Des. R., 21B; Peyton, 207). Peyton

¹ T. Walcott, born in Warwickshire, and one of Ludlow's generals, married a dau. of T. Blaney, of Tregonan, and his wife, dau. of F. Berkeley, of Askeaton, and had eight children. He says he "was always clapt up on all occasions [of disturbance], but came off clearly." He was arrested for an alleged plot to take Limerick Castle by a mine, and bring in the Dutch; but the Government discredited the charge (C.S.P. Domest., 1673; full descent, MS., T.C.D., F. 3, 23, p. 113).

² The Sarsfields were of old standing in Limerick, and claimed descent from T. Sarsfield, circa 1170. From 1295 records are fairly numerous. Bodin de

distinguishes it from Cloghatred (*supra*, pp. 72, 79). The C. was granted to J. Stroude, 1587 (Carew i., p. 449), and in 1593 to Rob. Stroude, with Ballycottred, Cappagh, &c. (Fi. 5781). 1655 Held by Major-Gen. Hardress Waller (C.S., p. 50); not to be confused with Cloghatred, in Nantinan (*supra*, 316).

Fabric.—A tower 22 feet wide, the east side nearly perfect, with a side wing 20 feet by 12 feet, and chimney (O.S.L., 9, p. 438).

325. OLD COURT or SHANACOURT (29). Not marked. 1583 Peter Purcell, of Croagh, held the C. of Oldecourte magna, or Shanecourt, in Croagh (Des. R., 22; Peyton, 51, 73). 1655 Held by Mrs. F. Purcell, *alias* Berkeley (C.S., p. 51).

326. BALLINVIRA (20). Not marked. A doubtful site. 1583 Edus. mac MORRIS Hubbert held Ballingroirig, or Ballinuryg, C.,¹ Crough (Des. R., 24B; Peyton, 75). Distinguished from Ballinvearyek, Nantinan, and Ballinarooge, Cloncagh (*Ib.*, 64B, 77), but named with Amogan.

327. BALLYNAGOOLE (20). Not marked, near Hollywood. 1586 Ballingowle C., Croghe (Peyton, 71B); 1655 (C.S., 49).

328. AMOGANMORE or KNOCKAN (29). Marked. 1583 John Crone Sarsfield or MORRIS mac Edm. Sarsell or Sarsfield, in rebellion, held Amogon and the C. of Lackarewny Knockan (Fi. 4694; Inq. Exch., Jas. I., 6), or Omagan C. and Omaganmoore (Des. R. 22; Peyton, 72). 1588 Grant to Billingsley of estate of Edm. mac Morys (Fi. 5171). 1606 Ric. Hunt, of Ballymeccre, held Knockans, a parcel of

Sarsfield recovered Ballyladen (? Ballylathnan or Ballyallinan) in 1295. Roger de Lesse, the sheriff, accused of taking cows from Walter de Sarsfield and Donald O'Regan, &c. (Justic. R.). In Tudor times they flourished as a leading family in Kilmallock. Sir Dom. Sarsfield, of that place, was created baronet, 1619, and, eventually, viscount. The descent is given from Henry (whose great-grandson, Henry, was admiral temp. Hen. VI.), who was, it is alleged, common ancestor of the Limerick family and of Patrick Sarsfield, Earl of Lucan. Another branch settled in France, 1640.

¹ Not to be confused with Ballinarooge, in Cloncagh (Peyton, 64B), or with Ballywryg, or Ballyhourigan, near Croom, adjoining Caherass. This latter place takes its name from the Hourigans, a family still existing in the neighbourhood. In 1263 a quit claim of T. Origan appears (B.B.L., 43). See also Plea R., xxxvi Hen. III. Elena, wife of David Urgan, has a suit with Agnes, widow of Walt. Landrey; and (*Ibid.*, m., 5), W. Brun with T. Oregan, in Clonchere (called elsewhere Horachan), who held land at Kather? kenlys (Cal., pp. 78-9), and was killed in Turlough O'Brien's raid. In 1362 the lands and mills of Ballyhoregna, in the manor of Cloncheur, are granted (*Ib.*, 133); 1580, Cnogher oge O'Horegan held Ballyshearhown, joined in Desmond's rebellion, and was attainted (Inq. Exchr., 16).

Amogan (Equity Exch., Order I., May, 1606). 1611 A portion of the C. of Omoggane was reserved for Emory Lee (Inq. Chan., 6). 1613 F. Drew fixed its mears (Inq. Chan., 10B). 1655 Awangan, late estate of R. Hunt, granted to Ol. Lambert and Brook Bridges (B.D., p. 21; C.S., p. 50). 1668 Avongan or Amogan confirmed to Lambert (Act Sett.). 1719 W. Blunt, of Amogan, died (will, Limerick).

Fabric.—A tower 27 feet by 21 feet, walls 5 feet to 7 feet thick. It is 36 feet high, with a spiral stairs to north-east. Tradition says that James II. slept a night there (O.S.L., 9, p. 438).

CLONSHIRE.

329. CLONSHIRE (20). Marked. 1201 Cluonsiebra held by the Church of Limerick (B.B.L., p. 14). Reg. de S. Jacobo granted a mark off Clonshire to said cathedral (*Ib.*, I., xi.). 1252 Suit of Adam f. Rob. Rufi Capell and T. Oregan, or Orachan, as to five burgages in Clonchere (Plea R., m. 5d). 1336 The manor of Cluaincheur held by Bishop de Rupefort (Rental). 1586 Clonshere encastellan (Peyton, 197). 1608 Leased by the Bishop to W. Clarke (Vis. Reg., 1615). 1641 Jas. Crowe held it (Dep., 268). 1655 Clonshirebegg and Bohirbradagh, with two orchards, held by Captain W. Piggott in right of his wife (C.S., 52). 1659 Clonshiremore held by Captain T. Walcott with a mill and Loughill (Rev. Exch. Orders, p. 51).

Fabric.—A tower 24 feet by 15½ feet, 40 feet high, with three stories, the second vaulted, with neat ogee-headed windows to the west. There is a staircase turret with five stories to the north (O.S.L., 8, p. 240). The late Mr. George Hewson noted that there were two enlargements of the original tower.¹

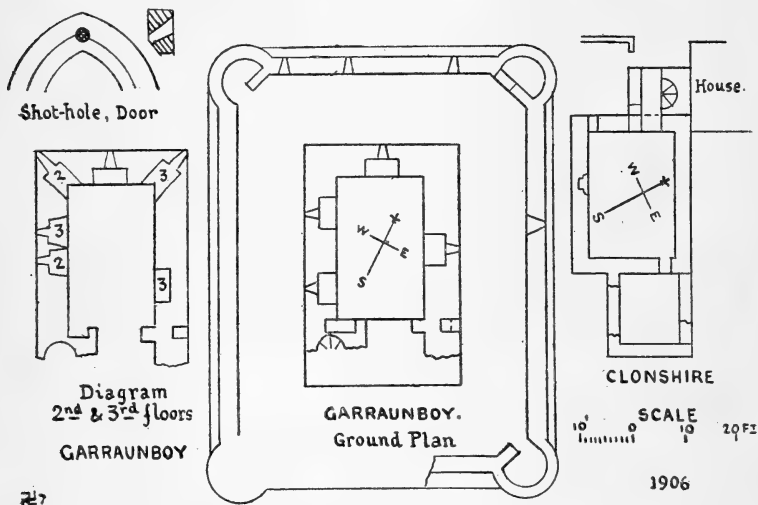
330. BOHERBRADAGH (21). Not marked. 1579 Redm. Wale, of Kyltennan, held Boherbravaghe and part of Clonshere (Inq. Exch., 16, p. 286); the son and heir of T. Wale slain in rebellion (Des. R., 73; Inq. Exch., 16, p. 286 and 54). 1517 Pierce de Wales held Ballygagany, Boherbradagh, and Kylboherbradagh,² in Clonshere (Peyton, 251B; and Fi. 5171). Jas. Wale held it (Inq. Exch., 32, p. 30). 1625 Bobradagh C. put in settlement by Sir J. Dowdall (Deeds, P.R.O.I., p. 32). 1655 Held by Piggott, with Clonshire.³

¹ See view, Plate XVI.

² Kylboherbradagh may represent "Bohernakeilly," a local name still used for Clonshire. Luke Speirin, of Cappagh, in 1726 desires in his will (Limerick, 1728) to be buried in the Church of Bohernakeilly.

³ See view, Plate XVI.

231. GARRAUNBOY (21). Marked. Garranbuidhe (O'Donovan, O.S.L., 8, p. 250), "The yellow wood" (Fitzgerald, i., p. 253); locally the "Yellow garden." 1583 Hugh Wall, or Falltagh, of Dunmoylin, when he joined the rebellion, owned Garrenboye C. (Des. R., 69). 1615 Held by Ol. Stephenson, of Dunmoylin, and confirmed to Ric. his son (Inq. Chan., 15B and 24B; Pat. R.). Confiscated from his representatives, 1655 (C.S., p. 52).



Fabric.—The O.S.L. only note it as "a ruin on a plain." It is an oblong peel tower 30 feet by 46 feet, outside. The main wing had four wooden floors covered by a stone vault; there is a skew-loop on the second floor opening at the north-west angle, and another on the third floor at the north-east. There are numerous ambries and ogee-headed window-slits. The end wing has the usual spiral stair with doors to each story to the south-west, and five stories with small rooms to the south-east. The lower rooms and top story are under vaults. All the southern face and most of the side walls of this part are gone. The peel stands in a bawn 63 feet east and west, 82 feet north and south. The walls 3 feet at top, and battered out to 6 feet below. The south wall and south-west turret are levelled. Turrets with vaulted roofs and 12 feet diameter, inside, remain at the three other angles. The peel tower dates from about the middle of the fifteenth century.¹

¹ I owe this plan and description (with a good photograph) to the kindness of Mr. James G. Hewson, of Hollypark.

CONNELLO UPPER.

The chief divisions were Gortculligon, at Knockfierna, Pubblemunterquyllan, in Kilmeedy, Corcamuicheat, or Corecomohide, and Pubbleneskagh. The barony once included Kilbolane and Brittas in Cork. In 1420 O'Huidhrin gives the principal families of Ui Chonall as those of Collins, Mulholland, MacEniry, Macassa, O'Bilraidhe, and O'Bearga.

KILFINNY.

332. KILFINNY (30). Marked. 1201 Kellnafidnaigi (B.B.L., p. 14). 1289 T. Bretnach deprived of Kylnafytheny, but reinstated (Plea R., 13); 1336 Kylfynygy; 1418 Kynafynygy. In 1569 Kilfenny C. surrendered (C.S.P.I.). 1583 Ger. f. Tho., when he rebelled with Desmond, held C., "gardin;¹ hort; pomar; edif; et molend," in parish of Ballynekylley, much wasted and ruined (Des. R., 70B; Peyton, 240B; Inq. Exch., 11). 1588 Granted to Billingsley (F. 5171). 1604 Put in settlement by Sir J. Dowdall to secure jointure to his wife Eliz., daughter of Sir T. Southwell (Exch. Deeds, P.R.O.I., 15, p. 22). 1615 The Bishop claimed it, but it was retained by Billingsley. 1623 Will of Sir J. Dowdall (Exch. Deeds, p. 46), Jan., 1642. The C. was besieged by the Confederates under Edy Lacy, of Bruree, who laid an ambushade, but was driven off by ten "mosceters" on a windmill. Gen. Purcell next arrived, who took the mill and barns, whence he was driven, and the buildings were burned in a sally, 8th and 9th. Ric. Stephenson, the sheriff, next assailed the C., and was shot. An attempt was made to capture it by "sows," but they were pierced through. It was then so loosely blockaded that Lady Dowdall relieved Croom five times from it. The surrender of Limerick C. gave heavy guns to the Confederates, so that Purcell, with a great force, assailed Kilfinny. After three shots Lady Dowdall surrendered, and was brought off safely by Lord Inchiquin (Hist. Irish Confeds. ii., p. 69, Deps. 138, 376). 1655 Killfinie C., orchard, and mill seat held by Gerott FitzGarrold (C.S., p. 46). 1683 Gertrude, wife of J. Piggott and dau. of Sir T. Southwell, was buried at Kilfinny, and a monument erected in 1718 (FitzGerald i., p. 383).

Fabric.—A court and two towers, the southern 20 feet by 8 feet inside; walls 3½ feet thick and 45 feet high, with two vaulted and

¹ The local usage of "garden" in two senses of "croft" and "garden" is evidently of old standing.

two upper stories. The court is 32 feet by 20 feet, with three stories; the lower vaulted. The north tower has pointed windows and loops. It is traditionally a McEniry Castle (O.S.L., 8, p. 130).

333. BALLYFOLEEN (30). Not marked. A doubtful site. 1615 Claimed by the See of Limerick, but only paid rent at pleasure (Vis. Reg.). 1631 Grant of livery to T. oge FitzGerald, of Ballyfoline, and W. and Edm., his sons (Pat R.). 1632 Edm. FitzGerald had held Fin-nitterstown and Ballyfoline, and died about 60 years ago. His son John held it (Inq. Chan., 102). 1655 J. Fitzgerald held it. The C. is marked (D.S.A., 6; C.S., p. 46).

DREHIDTARSNA.

334. FINNITTERSTOWN (30). Marked. The Minutor¹ family settled in Limerick before 1214, when Siward Minutor was Mayor (see B.B.L., pp. 40, 95). Maur. and Isabella held Catherybahely, 1295 (Plea. R., 22, m. 4), and lands at Ardagh, where "Miniterland" (as till 1669) is now "Ministersland." The branch bearing the name Vineter appears in the Justiciary Rolls from 1295.

The Limerick family was named Feleteragh and Finiter in Tudor times (*e.g.*, Fi. 2482), and the place was locally Baile an Fhirteara or Fliteara in 1840. Compare its name Phlitterstown (Fi. 6566). 1567 Balefynter was granted to Sir Warham St. Leger (Fi. 1143, 6566). 1572 Edm. Fitzgerald held Fyniterstown C. from the Earl of Kildare as part of Adare manor; his son John succeeded (Inq. Chan., 1632, Nos. 91, 102). 1586 Ballifynter or Fyneter's C. in Ballynekyllie parish and Pubbleneskagh held by J. Cullen (Peyton, 190B). 1590 "B. ne fedetor" in Hardiman Map (36). 1595 Granted to Sir H. Wallop (Fi. 5964). 1599 Essex, after raising the siege of Askeaton, was attacked by the Geraldines near Baile an Eleteraigh or Finnitterstown (Ann. F.M.). 1601 J. f. Edm. Fitzgerald, of Bal-lifynter, pardoned; also W. mac Morris Gankagh, of Phlitterstown (Fi. 6452-6566, p. 32). 1655 J. Fitzgerald held ruined C. and bawn (C.S., p. 47).

Fabric.—It is much defaced; the east and south walls remain, showing that it had four stories; the lower and second were vaulted. The west wall is barely 6 feet high (O.S.L., 8, p. 239).

¹There was a place named Monychard or Minetyr, near Bally Cahane, 1336 (Rental).

335. BALLINGARRY, Knightstreet (29). Marked. Ballingarry C. is a reputed Templary. The place is called Le Garth in 1291. In 1319 Garthbyboys was held by T. de Lees, and given in charge to W. Hampton (Grossi Fines). It had evidently belonged to the Byboys family. W. Byboys witnesses charters in 1228 (B.B.L., pp. 34, 74). In 1252 H. Byboys witnessed that T. f. Rob had enfeoffed H. Aunsell, and had not been disseised by him¹ (Plea R., m. 4 d). 1289 Rad. Biboys and Ric. del Esse. (See Plea R., 14. m. 2.) 1290 Alice, mother of Robert Byboys, was unjustly disseised of her lands in Cortynath (*Ib.*, 16, m. 24). 1295 Eliz. Byboys is summoned to the King's Bench in a suit of the Abbot of Keynsham; and Tho. Byboys also appears in the suit against Roger de Lees (Justic. R., pp. 27, 48). 1336 Dandree, *alias* Villa Rectoris, held by Bishop de Rupefort (Rental). 1408 The town was walled (Pat. R.). 1411 Tho. Saloys, *alias* Cristour, held Garthbiboy's in Limerick Diocese (Cal. Papal Letters, p. 231). 1569 Capt. J. Warde reported that Lieut. Creeves was wounded before Garrystown C. The place was then stormed and the garrison of forty men put to the sword (C.S.P.I., xxix., No. 68). 1578 Ger., Earlof Desmond, owned a "platea", called "strat. militis" in Ballingarry, and Lacy held the C. (Inq. Exch., 10, 11, 54). 1586 Shradenruddery, or Knightstreet, granted to Billingsley (Fi. 5171; Carew i., p. 450) Shanaclone C. at Knightstreet (Peyton, 56, 63). 1612 The manor, C., and town of Garestown granted to W. "Casie" (Lacey) (Pat. R.). 1641 J. Mason held the C., mill, and fair of Ballingarry. 1653 The Agents of Connolough pay £30 for hay for the garrison of Ballingarry (Account R., 8); Ballingarry or Dadrienarrylane (C.S., 38). 1667 Confirmed to J. Odell (Act Sett.). 1691 Burned by the Irish garrison of Newcastle.

Fabric.—A picturesque tower, but greatly modernised. It was repaired in 1821 for the Rev. T. Gibbings, and was called Parson's C., 1827, being used as a barrack during the Rockite troubles (Fitzgerald i., p. 381). The tower is 38 feet by 26½ feet outside, and consists of a main wing and turret, the former 55 feet high, with walls 3 feet 9 inches thick, of regular masonry. The turret is 68½ feet high, and adjoins to the north-west. It has a spiral stair and narrow opes, and a skew-arch across the angles. The main wing has three stories; the second has a vault; in the third is an old chimneypiece with "S.H. 16 (I.H.S.) 38. E.H." Removed from Kilmallock by

¹ Several Irish inhabitants are named—MacGrath, MacKathal, O'Colyn (Collins), O'Ryuerton (Riordan), Ohaskeran, and others.

Mr. Gibbings. The south-east window has three trefoil heads (O.S.L., 8, p. 64). See R.S.A.I., vol. xxxv., p. 262, paper by Dr. H. Molony.¹

336. CASTLE CURRICKY. 1583 The Earl of Desmond held Beolight, Castlecurricky, Knocknegornagh, Knightstreet, Mean, &c. (Inq. Exch., 54). Perhaps Castle McGurry, near Ballingarry, 1660, which Lt. Charles Odell held (Pat. R.).

337. CASTLE RAG. It stood near Ballingarry Church; a house had replaced it in 1840 (O.S.L., p. 66). 1653 J. Ragge was paid for the repair of the citadels; Ballingarry being a garrison (Acct. R., 13B). Lt. H. Moncton held "the short castle" in the town of Ballingarry (Hartwell's Acct. Book, P.R.O.I.).

338. BALLYCOLLO CASTLE. 1583 In Ballingarry (Des. R., 68). Jas. and Phil. Nash held the C. of Ballycolla (Inq. Exch., 54).

339. RYLAANS, Ballingarry; site of a bastion called "the Turrett" and "de Lacy's C." It is not marked on the 1840 maps, but was reputed to be a house of Templars. 1683 T. Odell² repaired it; that date and his arms appear on a tablet (R.S.A.I., vol. xxxv., p. 258).

340. WOODSTOCK (29). Marked. 1583 J. Roe Lacye held Boddestocke C. (Peyton, p. 59); or Ric. Mac Tho. Reylie, who held Bodestoick C. and mill when he joined Desmond's rebellion. He had mortgaged it for forty milch cows and their calves to J. Creagh (Inq. Exch., 11, 16). 1611 Rob. Cullum granted Bostocke C.³ to H. Billingsley, Alderman, of London, and the latter to Jas. Golde (Inq. Chan., 6B). 1641 W. Cullum, of Bodestow, "with souldyres," is stated by T. Southwell to have half-hanged and thrown into the Deel E. Harding (Dep., 268). 1655 Woodstocke and Cahyreenossa, W. Cullum (C.S., p. 41) granted, and, in 1668, confirmed to J. Odell (Act Sett.).

Fabric.—It was locally "Bunastoigh," and lies in a valley of Ballingarry. Only the lower part, 22 feet by 15 feet 9 inches, vaulted, 35 feet high, and walls 5 feet 10 inches thick remain (O.L.S., 8, p. 69).

341. LISSAMOTA (29). Marked. 1296 Suit of Ger. Bishop of Limerick and J. de Penrys about Lisnemotie (Plea R., 22, p. 3D). 1583 Ric. mac T. Reylie, of Lissenvotye, held the C. (Des. R., 19B;

¹ See view, Plate XVI.

² Edm. Odell held Pallas, in Kilmeeady, 1611. A pedigree is given in O.S.L., 8, p. 72.

³ By a strange coincidence a Launcelot Bostock was commissioner to inquire as to lands of the Knight of Glin in 1587, and, with Beston, got an extensive grant of lands.

Peyton, 59; Inq. Exch., 16). 1588 Granted to Billingsley (Fi. 5171; Carew i., p. 450). 1599 It was taken from J. Roe Lacie by Carew's forces. 1606 Capt. Cullum's rents not to be distrained for his Seignory off Lysmote and Calloe (Rev. Exch. Order I., P.R.O.I.). Suit concerning Jas. Listin¹ (father of Ric. and grandfather of Garrett Listin) and Ellinor, widow of his son Ric. f. Rob. Cullum, of Lissin-votty, as to Liskannitt (Eq. Exch. Order, Feb., 1606). 1611 "Cullen" had granted it to Billingsley, who granted it to Jas. Goulde, whose son Thomas held it (Inq. Chan., 6B). 1623 Sir J. Dowdall owned it and Kilshane Abbey (Inq. Chan., 15). 1641 W. Collum, of Lissamota, joined the Confederates (Dep., 134), and it was confiscated, 1655 (C.S., p. 41). 1653 Quartermaster H. Lee held the C. (Hartwell Acct.). 1665 Liosamhota granted to Sir Allen Broderick, ancestor of Lord Middleton. It was inhabited till the end of the eighteenth century, when a Mr. George Cornwall lived in it, whence its good repair.

Fabric.—It is $14\frac{1}{2}$ feet by 12 feet inside the walls, $5\frac{1}{2}$ feet thick, and 60 feet high. The first two stories vaulted, and three others. It is a conspicuous landmark; the ring of the mote had, in 1840, been recently removed for top-dressing (O.S.L., 8, p. 36).

342. KILMACOW (30). Not marked.² An appanage of Keynsham Abbey. 1319 Sybilla de la Chapelle claimed one-third off Kilmecho (Plea R.). 1569 Supple's C., of Gillemakuo, surrendered (C.S.P.I.). 1583 It was held from Earl of Desmond by J. Supple (Peyton, 57B; Inq., Exch., 11, 54). "The large square C. of Killmackwoo, with nine separate rooms, ruinous in parts. It is surrounded by a strong wall, built strongly for defence." Adjoining were gardens, a rather ruinous water-mill, orchard, &c. (Des. R., 68). Granted before 1588 by Supple to Billingsley; 1590 by him to Rob. Graves; 1593 to Ric. Whittaker; 1598 by him to W. Butler; the C. being a sufficient residence (Inq. Chan., 6B; Carew i., p. 450); 1623 by Sir J.

¹ Ric. Liston paid Sorrohen on Kilsconnell, 41B, Des. R. The Listons subsisted as landed gentry to 1766 (Dub. Reg. Deeds).

² An error may here be corrected as to the churches near Kilmacow, in "Ancient Churches of Co. Limerick," Proc. R.I.A., vol. xxv. (c.), pp. 410, 411. The "Abbey" of Kilmacow had been levelled about 1880; the ruin had a pointed window. My informant was misdirected to Morenane instead of Kilmacanearla Church (p. 411); so instead of the description given of the latter we give the following:—Kilmacanearla Church is nearly levelled. There remain foundations 50 feet by 18 feet, apparently divided into nave and chancel at 20 feet from east. At 100 feet from it is a wall 8 feet long. (See R.S.A.I., xxxv., p. 261.)

Dowdall (Inq. Chan., 15A). 1655 W. Butler owned Killm^cew (C.S., p. 43). The Peppard family resided there early in the next century.

Fabric.—A large bawn, in which is a nearly levelled tower, which, in human memory, had fine mantelpieces. A farmhouse occupies part of the site. It is on the north slope of Knockfeerina.¹

343 BALLYGUILLEATAGGLE (38). Marked. 1569 Ballegeltegoul C. surrendered (C.S.P.I.). 1583 J. O'Lacy held it at Desmond's rebellion (Peyton, 60; Des. R., 19B). 1612 Granted to W. Lasie (Pat. R.), who held it in 1641 and 1655 (C.S., p. 51). 1667 Confirmed to J. Odell, as Ballyteigmill, or Ballygelitaglee (Act Sett.).

Fabric.—A truncated tower partly covered by farm buildings.

344. FRANKFORT (37). Not marked. 1583 David Encorrig (Gibbon), Lord of the Great Wood, owned Ballynranky,² in Toghe Gorteuilgion (Des. R., 20B). W. oge Hurley held Ballenevrannke and Lickadoon (Inq. Exch., 12, p. 273). 1607 Ballynefranky C., estate of Piers Lacye, of Bruff, who was slain in rebellion. Granted to Sir Jas. Fullerton (Pat. R.). 1655 Held by Ed. Stands (C.S., p. 39).

345. DURRACLOGH (37). Not marked. 1584 Pat. Lacie held Dorochlo C. and Broffe C. (Inq. Exch., 11). It was in ruins (Peyton, 63B; Fi. 5171). 1601 Piers Lacy, of Derryclogh and Bruffe C.s, slain in rebellion. He had mortgaged the first in 1589 (Inq. Exch., James I., 3). 1607 Grant to Fullerton. 1655 Held by Stands—as in last.

346. LISDUANE (38). Marked in new maps as an ancient "turret," "Jackson's Turret," in 1827 (Fitzgerald i., p. 381). 1655 Miles Jackson held Lisduane (C.S., p. 41). Doubtful site.

347. DOORLUS (38). Not marked. 1296 Several suits are recorded. J. and Joan Grym *v.* Roger de Lees, about lands, and a mill, at Thurlys, near Garthe (Plea R., 22). 1299 Ric. Myath disseised of it (*Ib.*, 13). Suit of And. Miath and Roger del Esse, about same (*Ib.*, 14, m. 17). 1318 N. and Juliana de Les *v.* Roger de Les, about land there (Mem. R., m. 6). 1300 Ric. Miath *v.* David and Matilda de Barry, about same (Plea R., 52, m., 12); and Stephen Lewa *v.* J. Grymban, about a deed of feoffment, of Thurlys, in the

¹ Knockfearyny, 1583 (Des. R., 26B). Knockferanagonell (Hardiman Map, 56). For its antiquities, see paper by Dr. H. Molony, R.S.A.I., vol. xxxv., p. 255. The name is, perhaps, akin to Ballyfirne in same county.

² Perhaps named after the family of Franceys, French, or Franks.

tenement of Garth, formerly made by Sir Roger de Les (Plea R., 117, m. 9). 1452 Royal service of Belathdurlye to Earls of Desmond (Rental of Oconyl). 1583 T. mac Phil, in Gorteuilligon, held Ballingarry, Ballyne, and Durlus (Des. R., 19B). 1655 Durlas held by N. Haly (C.S., p. 39).

CLONCAGH.

348. BALLINAROOGA (37). Site marked. 1583 Rorie mac Shihie held Ballinrogo C. (Peyton, 64). He, in 1591, enfeoffed his son, Murrough (Inq. Chan., ix., 66), but was slain in rebellion, 1600 (Inq. Exch., Jas. I., 5). 1604 It was granted to Sir H. Bronker (Inq. Chan., ix., 66). 1632 Murrough mac Shihy settled Ballyallinan, Ballinarogie, &c., on his wife, Ellen Butler, and son Eddie (Inq. Chan., 110). 1655 Held by latter (C.S., p. 44; D.S.B., 13).

Fabric.—It has been levelled since 1840.

349. CASTLECROME (37). Unknown. It adjoined the last on the west; so it was either Ballykennedy or Ballybeggan. 1655 Castlecrome Cloncagh, Edm. Shehie (B.D., 19; C.S., p. 44). 167 Nic. Haly, of Tworin, owned Castlecrowyne, Woodstock, and Caherhennesy (Inq. Chan., 6A). There was a family of Croyne settled in Limerick from at least 1360, when H. Croyne was bailiff of the city.

KILMEEDY.

350. PALLAS (45). Not marked. It stood near Kilmeedy Church. 1582 Ger. f. Tho. pardoned (Fi. 3842). Ric. and Ger. mac Tho. held Palice (Inq. Exch., 4, 11). Rob. oge Cushen, slain in rebellion, seized of C. and vill. of Le Pallace, with buildings, orchard, garden, and water-mill; waste, and very ruinous; Ric. mac Tho. (Des. R., 70). He held the patronage of Rathronan Church (Inq. Ex., 54). "Et Ayeria, vocat, an eyrie of gosshauks" (Peyton, 240; and see p. 42). 1587 Grant of C. to H. Ughtred (Carew, Inq. Exch., Jas. I., 54). 1611 Edm. Odell held C. and dwelling-house on a sixty years' lease (Inq. Chan., 6B). 1642 The C. was besieged in January by the Confederates under Edm. Fitzgerald, of Gortnetubrid and Clenlis, he "murthered" certain of its inmates at "Mayne, near the said C." (Deps., 194, 227, 245, 433).

DROMCOLLIHER.

351. GARDENFIELD WEST OF MUSKRYNOONAN (45). Site marked on new maps. It preserved the name of the old tribal territory of the Onoonans. The family, though connected more with County Cork

than with Limerick, were of old standing in the latter; Anlaue Onoyne, or Oneonan, being bailiff of Limerick in 1279, 1280, and 1295. In 1591 W. Power, of Kilmeadan, Waterford, was granted lands near those of O'Nownan, including the chief rents of Kilbullen (Kilbolane) and Mouserinownan, belonging to last (Fi. 5535). 1593 Grant to Robert Stroude, of Muskereye-nownan, the land of Donogh Onownan, attainted (Fi. 5791). The latter was slain in Desmond's rebellion, and died unpardoned, holding said lands in County Limerick, except 30 acres now in Cork (Inq. Exch., 29). 1594 O'Hynownane, late of Castleshishen, held 20 acres near it, called Muskry O'Honownan, in County Limerick (Inq. Exch., 51). The free tenants had also been in rebellion (Inq. Exch., 54). In 1655 Col. Cortnaye held it with the ruins of a mill and church (probably Ahshankill, on the Deel, O.S., 45). It was meared by Modallihy, on the west, and Mullaghard, now Highmount, on the east (C.S., p. 27).

Fabric.—It had been levelled, and a barn built on its site by 1840 (O.S.L., 8, p. 59).

352. MARYVILLE, BALLINRUANE, or BALLYMURELY (45). Not marked. 1583 Ballynwrely, or Ballymurely, a C. in Pubblemynterquyrrine,¹ Kilmeeady, held by Phil. Okahill (Des. R., 19; Peyton, 47). 1655 Ballinwrillie, held by Col. Courtenay; the mears given (C.S., p. 28). Ballinruane has absorbed it, Ballycahill, and Ballyindigannig. The name Maryville is an evident mistranslation of Ballymurely. The C. may have been at the large rectangular earth-work called Knockaunacappeen.

CORCOMOHIDE.

353. CASTLETOWN-MACENIRY, or -CONYERS, CORCOMOHIDE² (38). Marked. Before 1276 Corkemoyd manor had been granted by Maur. f. Maurice to his son-in-law, Sir T. de Clare (C.S.P.I., No. 240). 1284 A market was established there. 1291 Amabilia, co-heiress with Juliana de Clare of said Maur., gave seizin of the manor to J. f. Tho. (*Ib.*, 940). 1295 The Vicar of Corkemoyt complains that Douenald O'Bren and other felons took his horse, worth 4 marks of goods, Roger de Lesse, the sheriff, accused of having given the King's peace to Malothlin mac Phil. M'Kyniery, who slew two Englishmen

¹ *Recte*, Muinterquylylyn. Mahon O'Quillane appears as holding land, 1583 (Des. R., 19). Tho. MacHewe next held it.

² The ancient tribe of Corcamuicheat derived their chiefs from Sedna, son of Cairbre Aobhúha (ancestor of the O'Donovans, Fir Tammaige, &c.), grandson of Fiacha Fidhgeinte, *circa* A.D. 380, eponymous of the Ui Fidgeinti.

in Corkemoy town; this the sheriff denies (Justic. R.). 1302 It was destroyed by war (Taxat.). 1315 Bishop Eustace to prove his claim to it (Mem. R., 224). 1322 Rob. de Welle and Matilda de Clare, his wife, held the C. of Corcomoyth (Grossi Fines). 1344 Rob. de Clifford held it (Close R.); then R. de Salkeld and J. Dammartin held it for the Crown. 1347 Sir Maur. f. Philip held Corkmothyde, with Carnarthy, Grangenekeryl, Dyrgalvan, &c. (Pipe R.). 1389 Pardon to Sir T. and Joan de Clifford for having acquired the manor (Chanc. R.). Legend says that MacEnery built the C., 1349, but the dates do not agree. 1420 "Mac Innerigh, hero of gems, over mellow Corca muicheat" (O'Huidhrin). 1583 J. Mac Kenry, of Ballycastellane C., in the Toght of Clonehennery (Des. R., 18B; Peyton, p. 41); Teige mac Morihertigg de People Clanyhyerye, in Conolaugh (Inq. Exch., 12, p. 280); and Jo. m^cMorirtagh B^w Mac Kynery, late of Clonye, rebelled with Ger., Earl of Desmond; the latter was slain at Racanan (Inq. Exch., 38). 1588 J. M^cKenry complained that he was dispossessed by H. Ughtred. 1605 He was confirmed in the "old C.," of Castletown (Inq. Exch., 54). 1610 Called the C. of Corkymohid-Oughtragh, in Tample Lisnemabyn, in Connelagh. 1625 J. M^cEnery still held it (Inq. Chan., 12).¹ 1655 It was out of repair, and held by Symon M^cEnery. It was granted to A. Brandon (B.D., 9; C.S., p. 27). 1688 Confiscated from Sir J. Fitzgerald, being his chief seat, with a C. and large orchard (Book of Postings, R.I.A.). 1703 Purchased by Cap. G. Conyers, and since held by, and named after, that family.

Fabric.—A small portion alone remained in 1840 (O.S.L., 9, p. 188).

BRUREE.

354. BRUREE, LOTTERAGH (39). Marked. Tradition alleges that Oilíoll Olum, King of Munster in the second century, made a fort at Brurigh, called also Dun Chuire, or Dun Eochair Maige, on the river Maigue. It is mentioned as a seat of the Dalcassian princes, and as claimed by the King of Cashel. In 976 Donovan inveigled King Mahon to a conference there and betrayed him to death. King Brian avenged his brother and eventually repaired the fort in 1002 (Annals, Wars G. and G., Book of Rights). 1178 The O'Donovans were expelled

¹ A deed cited, 1623 (m. Inq. Chan. 15, giving the property of Sir John Dowdall), mentions "vill. and manor of Castletowne, viz., the vill. with a ruinous castle there, and the walls of its ruinous hall lying near it, three messuages, six cottages, a garden, and water-mill.

and driven into Kerry by Donald More O'Brien (Ann. Inisf.). They are said to have built the C., and de Lacy strengthened it. It was, however, granted soon after 1200 by Hamo de Valoyngnes to J. de Mareys and Mabel his wife (Plea. R., No. 12, of xix¹ Ed. I.). It was held in 1290 by R. and Alesia de Mareys, and partly by Maur. de Esse with Culbalysyward, and Joh le Penry held Lisrede, Lisnemotie, and Brurys in 1296; next year, May, wife of Rob. f. John, held a mill and land at Browry. 1343 Pat. de Lees held Browry from his father (Plea. R., 14, 22d, 36). 1420 O'Huidhrin names Dun Chuire. It was then long held by de Lacy. 1583 Ed. Lacy de Bruerie held Brewery C. and vill. (Des. R., 18), and Ballynaughte C. (Ballynoe), in Browrie (Peyton, 37). 1641 Ed. Lacy took a prominent part in the civil war. 1653 Capt. Rob. Stannard held Brury C. on lease (Hartwell's Acct.). The Lady Eddy Lacye's estate with Brury C. and manor, and Tworin granted to Sir Cha. Lloyd and Lord Kingstown (B.D., 12). There were three small unrepaired C.s and a bawn, grist and tucking mills, and an eel-weir on the Maigue, with the manor and C. ploughland (C.S., p. 34). 1666 Confirmed to Sir Cha. Lloyd (Act Sett.). 1691 Burned by the Irish garrison of Newcastle.

Fabric.—The "Lower" and chief C. lies on the west bank. It has a circular garth 150 feet across, with battlemented walls of grit-stone 5½ feet thick and 20 to 24 feet high. (Fitzgerald i., pp. 371–3, gives its circuit as 120 yards.) There were three towers (as in C.S., p. 34); one was levelled between 1827 and 1840. Of the others, the eastern is perfect, 60 feet high, 19 feet by 21 feet, of five stories, with two vaults called O'Donovan's prison, 1827. The stair is perfect. The north tower is 24½ feet by 16½ feet, now broken. The gateway of the court is pointed, 7 feet 10 inches high, 5 feet wide; inside it is a lofty arch with corbels for a floor overhead, and facing the river (O.S.L., 9, p. 290). Tradition remembers the O'Lacys as "expelling the O'Donovans, and being themselves expelled by Cromwell." (See also "Round about Co. Limerick," Rev. Jas. Dowd, p. 61.)

355. BRUREE, BALLYNOE (39). Marked. The "Upper" C. stands at Bruree, near the church. It is traditionally a Templary. A peel tower about 70 feet high; the walls are 5½ feet thick. It has five stories, the third vaulted, and a spiral stair. The north-west angle has fallen (O.S.L., 9, p. 290).

356. GARRYFINE (38–46). Not marked. 1583 Garrefoine paid

¹ Also (Plea R., xviii Ed. I., m. 10) a tenement in Browry given in free alms to See of Dublin, c. 1200.

ducs to Ric. mac Tho., of the Pallace, Peyton; names its C. (Des. R., 70B; Peyton, 38B). It was granted to Sir W. Courtenay, from whom G. Meade held the C. and dwelling-house (Inq. Chan., 6B). 1655 Gerrett Miagh held it (C.S., p. 36); and in 1688 Hugh Fleming. It was then a broken-topped peel tower with an attached dwelling-house having a high roof and chimneys, and standing among trees. (Trustees' Maps).

NOW IN Co. CORK.

357. BROHILL (Cork 2). Not marked. The C. stood near Charleville, and was in 1586 in Clonekoghrea (Cloncoura or Colmanswell) Parish and Co. Limerick, being in the Toghe of Brohill, and held by Redmond mac Gerald (Peyton, 191).¹ Sir Ger. FitzGerald held Twoh de Brohill in Com. Lim. (Inq. Exch., 11, p. 246). It gives a title to the Boyle family.

358. KILBOLANE (Cork 1). Marked. 1587. The C. was then in Co. Limerick, and granted to H. Ughtrede as part of the estate of David Gybbin or Encorrig, Lord of the Great Wood (Carew MS.). 1613 The C. of Kilbolane or Kilbullen in Co. Limerick, granted to Sir W. Power (Pat. R.). See Gardenfield, 351, *supra*.

359. CASTLELISHEN (Cork 6). Marked. Six furlongs from the border. It is often assigned to Limerick, and those who do so have been accused of inaccuracy. The *Pacata Hibernia* locates it in Connello. O'Howdownane held it in 1580; it was then in Co. Limerick (Inq. Exch., 11). For its owners, the Fitzgeralds, see under Glenquin (372, *infra*). 1600 See the *Pacata* for the capture of the Sugan Earl, his imprisonment in Castlelishen, and his rescue by John of Desmond, Pierce Lacy, and 4000 men. It will be noted that the Limerick border has been much encroached upon. Cullen and Kilcolman, in Tipperary (*supra*, 104, 105), Tullylease Parish, Brohill, Kilbolane, Rathgogan, and probably Castlelishen, in Cork, and Kilmurrily, in Kerry, all once belonged to Co. Limerick.

GLENQUIN.

Though the name is old, the Barony is first separated from Connello Upper in the maps of 1840; even on those of 1836 it had no separate existence.

¹The question was even then raised as to its assignment to Cork. Peyton, p. 194.

NEWCASTLE.

360. NEWCASTLE WEST (36). Marked. It is said to have been a Templary, founded in 1184, but no records appear. 1269 Tho., grandson of John, was thirteen years in his lordship until he died in Caislen Nua O'Chonail, and was buried at Tralee (A.F.M.). 1296 Tho., "an appagh," died in Caislen Nua (O'Clery Pedigree). This Tho. f. Maur. held from the King in Capite, with the issues of the Grange of Kilbrodan, mills, serjeantcy, pannage, perquisites of Court, ale and meat from Newcastle, Killyde, and Ardauch, to value of £49 8s. 0½*d.*, besides Senede and Glenogra (Pipe R., 26, 27). 1298 The manor, C., mills, and edifices at Newcastle, inside the wall as well as without, require more expenditure than their profits (C.S.P. I.). 1306 Eliseus, of Lucca, and J. de Barry to have custody (Plea R.). 1315 When the "Irish felons rose on the coming of Bruce, they destroyed the C. of O'Conyll, and carried off the provisions" (Plea R., xi Ed. II., 124, m. 44). The O'Donegans and other tenants of Maur. f. Tho. destroyed Rathkeale and the new C. of O'Conyll. 1358 Maur. f. held it, worth 60s. (Inq.). It is said to have been a corporate town, but no records are found. 1399 Garrett, 4th Earl, died at Newcastle. 1420 It lay in Corcoithe or Gorcoythe, "Corca Oiche of the beautiful wood, a fair surfaced land of fresh creeks under the vigorous hero O'Macasa"¹ (O'Huidhrin). 1452 The lord's rents in the manor of Nova Castm, and the vill. of Nova Castri, mill, meadow, and worth 28s. 11*d.* (Rental O'Conyll). 1462 Jas., the 8th Earl, died in Caislen-nua-O'Conaill, and was buried in Tralee (O'Clery). 1569 The C. surrendered to the English (C.S.P.I.). 1583 "Newe Castle Maner, Castellnoa, a great square C., the chief house of the said Earl (of Desmond) in Connelo, having at each angle a round turret, with divers rooms and chambers. At the south-west angle are a square C., a high tower or peel, built for defence. Within the walls of the C. are many buildings, a great hall, a large vault, an excellent chamber, a garden, and in the same a fish-pond, all ruined and waste; outside are various orchards and a garden of 3 acres" (Des. R., 3B). 1591 Granted to G. Courtney, of Powderham, Devon (Fi. 5586). David oge Hubberd was the last Constable of the Earl's there (Peyton, 154). 1598 Sir W. Courtenay neglected his seignory and its defence; so it fell into the hands of the Sugan Earl, and had to be retaken, 1599 (C.S.P.I., 5, 27). 1611 Newcastle, with a fair C. and divers houses,

¹ Perhaps the Makisse (of Ballyfrayley, 1583) and Macassy family.

had belonged to Sir W., and was the chief place of his Seignory of Policastro. 1624 G. Ughtred Courtenay had a grant of fairs there and at Kilmeedy, with a court of pie powder (Pat. R.). 1641, Dec. The Confederates besieged it till Easter Monday, April 14th, 1642, when it surrendered, and was burned (Deps. 252, 317, 327, 337, 347). 1655 "The ploughlands of Newcastle, with C., bawn, and other houses, and worrekes, a weekly markett and an orchard, with a river running by the C., held by Col. Fra. Courtenay (C.S., p. 3). 1691 The Irish held it and Gortnetubbrid to keep the passes to Kerry, and from it burned Ballingarry and Bruree.

Fabric.—A tower attributed to the thirteenth century, but with later ornaments. The walls are 8 feet to 10 feet thick, the lower story vaulted. It has been greatly modernised. There are in the outworks a square and a round turret; the ruins of a chapel lie opposite, and some vaults and walls remain between it and the river; also the Desmonds' Hall or Banqueting Hall (see Rev. Jas. Dowd, "County Limerick," p. 212).

GRANGE.

361. GRANGE (36). Not marked. 1298 Nova Grangia, in Newcastle Manor, held by the heirs of T. de Clare under T. f. Maur. (C.S.P.I.). 1452 The Earls of Desmond held it (Rental). 1583 A ruinous C., called Granshagh, in Toughe Ogallyhowre (Des. R., 27). Morrogh mac Bryan of Granagh, *alias* Mac Tirrelagh, held the fee, C., &c., of Granogh, in Castelnoa (*Ib.*, p. 75B). 1587-93 Sir H. Ughtred got Graunshaugh C., late of Earl of Desmond (Fi. 5782; and Carew MS.). 1642, April, Capt. J. Southwell, of Rathkeale, with 40 horse and 100 foot, chased the Confederates from Newcastle, which they had burned, to Grange (Dep. 337). 1655 Grangie, given with Granshj Ightaragh, held by Courtney (C.S., pp. 8, 9).

362 BALLYPIERCE (36). Not marked. A doubtful site. 1569 "Penston" C. (perhaps Pierston or Ballypierce), in Connello, surrendered (C.S.P.I.). 1593 Gibon Roe mac Shane oge, of Kyllmore, held the vill. and fee of Ballipierse. He rebelled with Desmond, and it is pledged to Rorie mac Shee(hy). In later years, J. Suppel, of Kilmocaa, held Ballypeare (Inq. Exch., 44, 54).

363. BALLYFRALEY (36). Not marked. The Ui Fairchealla, Farrelly, or Frawley, family was widespread in Limerick, and gave its name to Ballyarella or Mount Ievers in Co. Clare. 1583 Donygalyn or Ballyfarewell, in Newcastle Manor, J. Omakisse (Pes. R., 13B). 1593 Ballynwryly, in Ballinacastelane, granted to Ughtred

(Fi. 5782). 1611 J. Tankard held Ballinwreyley or Ballinarely C. from Courteney (Inq. Chan., 6B). 1655 J. Shihie held Bally Earalla, in Grangie (C.S., 10); not to be confused with Ballymurely in Kilmeedy.

364. BALLYMORRISHEEN (28). Not marked. "Castlemorrisheen" on the Deel. 1583 J., Ed., and Ric. London held Ballywerishen or Ballymoryshen (Des. R., 19; Peyton, 76 and 145B). 1584 Maur. f. Edm. Hubard, of Castellmorshin; he had joined Desmond's rebellion (Inq. Exch., 10, p. 218). 1586 Rob. oge Cusshyn held Ballencoryshyn and Igallowyhoure (Inq. Exch., 16; Fi. 5782). 1653 Cap. T. Southwell held C. of Morishine (C.S., p. 9; Hartwell's Account).

CLONELTY.

365. BALLYWOLLANE. UNKNOWN. 1583 Ballyvollane C., in Clonelty. Nic. FitzWilliam (Des. R., 69B), W. mac Edm. oge mac Shihie, galloglass, of Ballinwollin or Miltown, took part in Desmond's rebellion (Inq. Exch., 54).

366. BALLYNOE (37). Marked near Clonelty Church. 1583 Eugenius or Owen mac Edm. oge MacSheehy, *alias* Owinus Bryan, was slain in rebellion holding the fee and C. of Ballynoa, *alias* the Newtowne C., garden, croft, and mill (Des. R., 71; Peyton, 241B; Inq. Exch., 10, 54; Carew MSS.). 1587 C. granted to Sir H. Oughtred (Carew MS.); and 1607 to Sir J. Fullerton (Pat. R.); 1657 Ballynoe, an old ruinous C., two orchards, and a mill (C.S., p. 8); not to be confused with Ballynoe, at Bruree, 355, or Newtown, 120, *supra*.

Fabric.—A fragment "much destroyed" even before 1840 (O.S.L., 9, p. 170).

367. KNOCKADERRY (36-37). Not marked. 1586 Knockadyrre C. in Clonelty (Peyton, p. 81).

MAHOONAGH.

368. CASTLEMAHON OR MAHOONAGH (36). Marked. The ancient Cluainclaidmech, 1201, held by the Church of Limerick (B.B.L., p. 14). It appears, 1237, as Maytaueny in a suit of W. Lacy. 1278 W. de Prøndergast and Geff de Mariseis exchanged Fernan, a theodum, for another called Maccauen in O'Connill (C.S.P.). Held by Tho., Gilbert, and Ric. de Clare (1280-1318). It derives its name from the Fir Tawnagh Tribe, whence Tawnagh, not Magh Gamhnach nor Medhonach.¹ 1418 Moytawenagh (Taxat. Proc.). 1580 Phil.

¹ See R.S.A.I., vol. xii. (1871), p. 629.

macGibbon "Oor" held Mahawnagh (Inq. Exch., 11, 16). Mohonagh, in Tawnagh (Peyton, 36, 50, 51). The Bishop still took dues on its parsonage and street (*Ib.*, p. 204). 1587 Mohannogh C., late estate of McGibbon to Sir H. Ughtred (Carew). 1606 Sir H. Ughtred held the manor, C., and lands of Maghawnaghe (Inq. Exch., 15). 1611 Mahownagh C. and lands, with a sufficient dwelling, leased to J. Aylmer (Inq. Chan., 6B). 1641 Mr. Escott held the C.; he was expelled, and some of the English hanged at Mayne (Dep. 161). 1655 Held by Courtenay; C. in good reparacon and mill seat (C.S., 11-12).

Fabric.—The tower is 35 feet by 24½ feet, inside; the walls, 6½ feet thick and about 35 feet high; it has no remains of vaults. There are pointed windows of cut limestone (O.S.L., 8, p. 48).

369. MAYNE (45). Not marked. It was remembered recently, the modern house being on its site, and was a reputed templary. An appanage of Keynsham Abbey, surrendered 1227 (B.B.L., p. 75). 1255 Walter Wansell, the sheriff, accounts for ward of the C. of Mayn (Carew MSS.; Book of Howth, p. 428). Thomas an Appagh granted Meine to Gibbon, son of J., of Callan, whence the MacGibbons, White Knights. 1307 Suit of the Prior of Rathkeale and Hugh Purcell as to dues off the manor of Mayen (Plea R., Cal., p. 205). 1309 Sybil, widow of H. de la Chapelle, claims one-third of Mayne (Repert. Plea R., p. 32). 1551 J., the White Knight, was compelled to transfer Meine to the Earl of Desmond. 1583 The Manor of Bean, late perquisite of the White Knight from the Earl of Desmond, "one C., which was an excellent and ample residence before the rebellion, in which it was totally wasted, so that at present (1583) nothing but the stone walls remain" (Des. R., 15B; Peyton, 50; Inq. Exch., 54). 1592 Grant to H. Ughtred of the C. of Meine *alias* Mahownagh and Treanmeane, and the house of Mahownagh (Fi. 6533). 1598 The C., of Meane, Pallice, and Ballinwyly belonged to Sir H. Ughtred; he fled with his wife to Limerick, leaving sixteen men in the house, who fled after two days, and the Irish took it (C.S.P.I.). 1600 Garrett Fitz Nicholas, the nearest rebel to Askeaton, was "haunted and hunted" by Sir F. Berkeley, who took the C. of Mayne and all the rebels' corn (Pacata Hib. i., chap. xii.). 1611 The Manor of Meane and 400 acres held by Paul Arrondell from Sir W. Courtenay for thirty-one years, whereupon was a fair house, erected by Sir H. Oughtred, but defaced in the late rebellion. There is now a sufficient dwelling on it (Inq. Chan., 6B). 1624 Pardon to T. Fitzgerald for

alienation of Gortnetubbrid, Mayne, &c. (Pat. R.). 1655 Meane C., out of reparacion, held by Col. E. Courtenay (C.S., p. 12).

Fabric.—The remains of the old C. fortifications at the Manor of Mayne were turned into a barrack before 1827 (Fitzgerald i., p. 377).

KILLAGHOLEGHAN.

370 GORTNETUBBRID OF SPRINGFIELD (54). 1569 Cortenaytowbryte C. surrendered (C.S.P.I.). 1579 A fierce battle fought near it, in which Jas. f. Maur., who had recently returned from Spain, defeated the English under Drury and Malbie (A.F.M.). 1581 T. Caune f. J. de Geraldinis¹ held it with Killeedy and Clenlish; his son Maur. succeeded (Des. R., 73B; Fi. 5998; Peyton, 244B; Inq. Exch., 11, 12, 20, 53, 54). 1607 Suit of Maur. f. Tho., of Gortentubert, and G. Oughtred Courtney (Equity Exch. Order, June). 1624 Pardon to T. Fitzgerald, of Cleanlishe, for alienation of Gortintubbrid C. by trust deed, 1614, to Theo. Lord Castleconnell and Tirlogh oge O'Brien for use of Slany Fitzgerald, *alias* O'Brien, his wife (Pat. R.). O'Sullivan Beare calls it "Ager fontis." 1653 M. Bromley, for horse soldiers quartered there, £35 7s. 0d. (Acct. R., 7B). 1655 The C. held by Sir E. Fitzgerald (C.S., p. 25). 1670 Sir E. Fitzgerald, Baronet, of Clanlish, confirmed in the C. (Act Sett.). 1703 Hon. W. Fitzgerald purchased Gortnetubbred C. and lands, the late estate of Sir J. Fitzgerald, attainted (Pat. R.). 1708 The latter fell at Oudenarde; his widow had a jointure on Gortnetubbrid.

Fabric.—A very perfect square tower adjoining Lord Muskerry's house. It is 34 feet by 21½ feet, the walls 5 feet thick and 45 feet high, with four stories; the second vaulted. The windows are of well cut stone (O.S.L., 8, p. 52).

KILLEEDY.

371. KILLEEDY (44). Marked. Near the famous convent of St. Ita of Cil Ite. 1299 Tho. an Appagh and his descendants, the Earls of Desmond, owned the Manor of Killyde (C.S.P.I.; Pipe Roll, 1452, Rental). 1581 C. and vill. held by T. Chane. 1587 Granted to A. Hungerford (Carew i., p. 448). 1596 T. Cawne and his son Maur. got livery, and were granted Desmond's C.s Kyledie, Gortnetubred, and Lisnekilly (Pat. R.). It was held, like Gortnetubbrid

¹ He was included in an Act of Attainder, but was covered by a general pardon, which the Munster Council enforced in his favour. Thornton, the sheriff, was ordered to seize back his lands, which had been granted to Trenchard.

(which see), by the Fitzgeralds (C.S., p. 15). 1663 T. Walcott, of Croagh, mortgaged Killeedy, Clonagh, &c., to W. Shippy (Act Sett.).

Fabric.—It is on a mound near a bend of a stream, and, though lofty, is utterly defaced. Tradition attributes its foundation to King John. A view is given in Canon O'Hanlon's "Lives of the Irish Saints," vol i., p. 200.

372. GLENQUIN (44). Marked. 1298 The lands of T. f. Maur. (Thomas an Appagh), in his Manor of Newcastle, include Kilnehyhyn (compare later Killanohwyn for Glenquin), and perquisites of English and Irish in Corkoygh at the courts of Newcastle and Killyde (C.S.P.I.). 1299 W. Dundonenald held Glyngowan (*Ib.*). 1452 Glencoyne, in the Manor of Killeedy, dues at Easter to the Earl (Rental Oconyll). 1569 Killanohwyn (or Glynquin) C. surrendered (C.S.P.I.). Glanno-whyni C. (Peyton, p. 129) or Glanekynic, held by Maur. f. David (Inq. Exch., 54). 1587 Granted to Hungerford (Carew MS.), and in 1595 to Capt. R. Collum, Glengoune (Fi. 5947). Tradition said that Glenquin was built by O'Hallinan, who, with his family (save one son) and followers, was put to the sword by O'Brien, of Glynistare; the rescued boy (like him in the old ballad) eventually recovers the C., and avenges his family (Fitzgerald i., p. 378).

Fabric.—A tall peel, 30 feet by 40 feet, with seven stories; it was carefully repaired in 1840 by Mr. Furlong, the Duke of Devonshire's agent (O.S.L., 9, p. 79).

ABBEYFEALE.

373 PORTRINARD (42). Marked. It is on the Feale and near Tara Luachra. Tradition states that from it Thomas, son of the Earl of Desmond, started on the hunt, which led to his marriage with MacCormac's daughter and the loss of his inheritance. This tale suggested Moore's song "By the Feale's Wave Benighted." 1577 Portrenard C., "the fort of the three enemies," *recte* "heights," given to J., of Desmond (Carew i., p. 113; Peyton, p. 170). A C. built of a round form on the Mount of Slewlogher (Des. R., 16). 1580 Pelham camped near it on his march to Tralee (Carew MS.). 1587 Granted to Hungerford with the cell of Nephelaugh or Abbeyfeale (*Ib.*, p. 448), and, 1591, to Sir W. Courtenay. In 1613 Portrynard, part of the lands of the Abbey of Feal held by Sir J. Jephson (Inq. Chan., 5A), and, 1655, by Jas. Borke (C.S., p. 23). 1669 Confirmed to N. Bourke (Act Sett.).

Fabric.—It is described by the Desmond R. as a *round* C. in 1583. It has evidently been rebuilt, being a very low, rude, and late square

tower, 40 feet by 13 feet, outside, and 20 feet high; the walls are 6 feet thick; the lower story vaulted, and 15 feet high. Curious sloping depressions run down the walls, all the features are defaced, and the end at the doorway broken down. It stands on low ground (O.S.L., 9, p. 144).

SHANID.

The last of the modern divisions of Connello. In the usual English fashion, it is named after its earliest chief castle, instead of after a tribe, or natural feature. The smaller divisions are Glancorbry, round Glin, Toghe Meahan, or O'Baithin,¹ in Rathronan. Most of it consists of low, green hills, once thickly wooded, so that its castles lie to the east of the White River, or on the Shannon.

KILFERGUS.

374. GLIN or GLENCORBRY (17). Marked. *Circa* 940 Ceallachan Caisil, King of Munster, fought against the Kerry men and Norse, at Glenn Corbraighe, and other pitched battles, at Senguala-Cladard, of Ui Conaill (Shanagolden), and Cromad, or Croom (Cathreim Ceallachain Caisil, pp. 71, 87). 1222-30 Ric. de Londres held Glancorbry (B.B.L., No. xxxix.). Sir J. Fitzgerald, son of T. f. Maur. (an appagh), was killed. 1261 His three sons were—the White Knight, the Knight of Glin, and the Knight of Kerry. Sir John, the Knight of Glin, was given Glyncorbry and Beagh (later accounts say “with their C.s”) about 1260. This J. fitz John, 1289, disseised J. Breinach (Welsh), in Glicorbry (Plea R. 13, m. 15), and in 1289, held half a teodum in Glancorbry from the heirs of T. f. Maur. (C.S.P.I.). The successive Knights of Glin who held this C. were John, son of J. f. J., Sir “T. f. Jo. del Glyn, custod-pacis.” 1346 He gave hostages for his fealty to the King, and was sheriff of Tipperary. John, his son, one of the hostages, was living 1351; his son, T. del Glyn, died without issue, his heir being T., son of his brother, Phil. f. J., whose son Edm., Knight of the Glynn, was pardoned, 1496, as Dom. Edmo milite de Wayl (Pat. R. Engl.), living 1502. In his time, 1452, the Rental of O'Conyll gives the Manor of Glancorbry, subject to Earl of Desmond. Tho. f. Edm. attainted 1526 and 1567 (Records, Ulster's Office, &c.). 1562 The Earl of Thomond made a raid to Gleann Corbraighe, where O'Loughlin was slain by a shot

¹ 1252 Rahenilda, widow of H. f. Hubert, claims a third of the theodum of Obethan (Plea R., m. 5).

from Clogh Gleanna¹ C. (A.F.M.; O'Sullivan Beare renders the name Vallirupa). 1573 The Earl of Desmond put his man, Jas. Dore, at the head of all the carpenters and masons of the country to raze the Glan (C.S.P.I.). 1578 Granted to Sir W. Drury, President of Mounster, of the C. or manor of Glan, with mill, cottages, and fourteen carrowes, or quarters, each of 12 acres; also Castletown (Kenry) and Keppaugh, late possessions of Tho. f. Gerald, Knight of the Glan (Fi. 3277). 1583 Glan Corbry, in Killfaryse, with the C. of Cloghglan, called ffarrenyer-Ruddery (Peyton, 227). Restored to Edm. f. T., grandson of its former owner, T. f. T. (see 1567), who had been executed in Limerick. The C. of Glencorbry waste (Des. R., 74B, 75). 1600 The Knight of Glin played a waiting game, and the C. was in the hands of the Sугan Earl's adherents. The English, under the President, besieged the C., entrenching themselves between it and the river. Captain Flower then took the great hall and turret-stair, burned the door, stormed the keep, and took the roof, whence the surviving Irish leaped; eighty Irish and eleven English were slain (Pac. Hib. i., p. 113). 1603 Edm., Knight of the Valley, got pardon on condition of his resignation of the C. to Jas. I. The C. has since been held by the Knights of Glin. In 1655 Lt.-Col. Widnham rented it (Hartwell Acct.). It was called Ballygallyhannan, in Kilfergus (Ballygillen adjoins it still), with manor, Courts Leet and Baron, old C., a ruined bawn, two mill seats, and a brook running by the C. side (C.S., p. 100).

Fabric.—The tower is 21 feet 8 inches by 19 feet inside, and 40 feet high. Old people, in 1840, remembered it about 30 feet higher. The walls are 8 feet thick; there are four stories, two with broken vaults. A plain structure of thin flags; all features defaced (O.S.L., 9, p. 149). The Hardiman View (No. 60, reproduced *ante*, Plate xiii.), and that in "Pacata Hibernia," show it as in 1600, during the siege. The bawn was 102 feet by 92 feet; it had a main gate to the north, a turret at each eastern angle, the great hall to the north-west, and the keep to the south-west. All, save the stump of the keep, is now levelled.

375. COURT (17). Not marked. 1583 Meanes and Tannacourt, Kilfergus (Peyton, p. 106). 1590 "The Meanes," a castellated building, with a side wing (Jobson's Map, Hardiman, No. 60). 1655 Courte and East Meanes, held by T. Fitzgerald, of Glin (C.S., p. 97).

¹ This usage of "cloch" for a stone building, whether residential or monastic, is not infrequent in the county.

LOGHILL.

376. LOGHILL (39). Not marked. 1201 Lemchaell (Leamhcoil) held by the Cathedral. 1274 Held by J. de Penry. 1280 By Roger Waspayl, who granted Lochkyl Manor to J. Mautravers. 1289 By Steph. f. Reymund (Plea R., 15, m. 15), named Lamkyl. Matilda, his wife, claimed dower from heirs of her late husband, W. Myagh (*Ib.*, 14, m. 27). 1299 The Irish cotters and gavillars, with Drumdele and Lauwyl (held by the Crown during vacancy of the See), granted to the Bishop-elect, Rob. Dundonyll (Pipe R.). 1302 Wasted in the war. 1336 Manerium de Leamkaill (Rentals of de Rupefort and O'Dea, &c., 1336 to 1459). 1590 The C. of Laugill (Hardiman, No. 2). Ric. White held it (Inq. Exch., 54). 1610 Recovered by Bishop Adams, and leased to T. Lowe (Vis. Reg., and B.B.L.). 1621 Ric., son of R. White, got livery (Pat. R.; Inq. Chan., 54B). 1640 J. Holme, after writing about apparitions at Castleconnell and Knockainey, adds :—"Upon a manor of my Lord Bishop, Loughill, hath been seen . . . abundance of armed men marching. I purpose to go to the C. better to satisfy myself" (Len., p. 147). 1655 Louveghill (C.S., p. 96). 1670 Leased by G. Crofts to Mountiford Westropp, of Ballyartney, Clare (Atkins Davis MS.).

ROBERTSTOWN.

377. FOYNES ISLAND (10). Not marked. 1452 ffoyns, held by Earl of Desmond (Rental). 1569 Honne (*i.e.* ffoinne) C. surrendered. 1570 Dionys Cahissie, Chancellor of Limerick, held ffoyne C. (Inq. Exch., 11). 1582 Pardon to Morrish oge Shihy, of Foyn (Fi. 3842). 1583 Desmond held the C. and Island in Ballyrobert (Des. R., 11B). 1587 Same granted to W. Trenchard; after his death, his executors left it to the enemy (Fi. 5078; C.S.P.I., p. 325). 1611 Same confirmed to Trenchard (Pat. R.); Jas. Creagh held under lease from him the broken C., &c., on the Island (Inq. Chan., 6B, 35B). 1637 Ed. Trenchard held same (see also C.S., p. 95).

378. KNOCKPATRICK¹ (10). Not marked. 1199 A C. built at Ardpatrik, along with Askeaton (Ware Ann.). 1336 Cnockpatrick (Rental). 1569 The C. of Patterick's Hill surrendered with Shannet, &c. (C.S.P.I.). 1586 Held by Moriort O'Nea (Fi. 4935). 1587 The C. and church granted to W. Trenchard (Fi. 5078).

¹ Probably "Ardpatriaic, in Ui Chonaill Gabhra." 1114. See Proc. R. I. A., vol. xxv. (c), p. 395.

1601 Don. Onee, of Knockpatrick, pardoned (Fi. 6566). 1612 Confirmed to F. Trenchard. 1657 Held by Col. Trenchard.

379. CARROWNEMONA C. Unknown. 1583 In Monasternegillagh (Robertstown) Parish (Peyton, 104B).

380. CORGRIG (10). Marked. 1540 Don. Gow, Constable of the Earl at Corrugraige, used to take 100 oysters from each boat going to Limerick (Inq. xxxviii Hen. VIII.). 1569 C. surrendered. 1570 held by Rev. D. O'Cahissy (Inq. Exch., 12). 1579 The Earl held Cathergy or Corgraig (Inq. Exch., 11). 1583 The large and excellent C. called Corragg (Des. R., 11B). 1587 C. granted to W. Trenchard.¹ The extent of the Manor of Corgraige, in 1587, was from the river of Loughill to Ballynash, to Dysert, Ballyestine,² Creeve, Dunmoylan, and Monemihane (Fi. 5078). 1600 Carew camped before Corgraige C. of the late Master Trenchard; the Irish surrendered, and it was given to Oliver Stephenson (Pac. Hib., i., p. 123). 1610 F. Trenchard held it (and the Manor of Mount Trenchard or Corgraige), except 15 acres belonging to Knockpatrick Church; he gave land to Ric. Gill for services to his father (Inq. Chan., 5B, &c.). 1655 J. Trenchard held the ruined C. (C.S., p. 94). It was held about 1690 by a Yorkshire family named Palmes,³ and at the close of the eighteenth century by the Griffin family, of whom was the poet Gerald Griffin.

Fabric.—The lower part of a very well-built tower, hardly 10 feet high in parts, remains on a low rock.

381. AUGHINISH (10). "C." and "Castle Farm" marked on new maps. The owners appear to have been, 1584-1601, Tiede O'Donogh or O'Duffie, Aghanes or Aghnes Island (Inq. Exch., 54; Fi. 6566), and, 1604, R. Lyster, subject to dower of his mother Marg. Bourke (Inq. Chan., viii., 237). 1613 Sir J. Jephson, Aghniss, as part of estate of Monaster ny gillagh (*Ib.*, 5A). 1616 Sir F. Berkeley, at his death. 1642 besieged (Dep. 302). 1655 F. Courtney (C.S., p. 95).

¹ Paganus Trenchard appears (1120-30) at Hordhill, in the Isle of Wight: his descendant, Sir T., relieved Exeter, in 1497, when besieged by Perkin Warbeck; from him derived W. Trenchard, of Normington, granted the Manor of Corgraige, or Mount Trenchard, 1587. His sons, Edward and Francis, of Rodaston, Wilts, confirmed in Corgraige, and died 1621. The published pedigrees seem inaccurate.

² Not the Kenry Ballysteen (143, *supra*), but an old property of the O'Dowd family, held by Andrew and his son, John, 1594 (Inq. Chan, 45); their lands not affected by the attainder of the Knight of Glin.

³ See Loftus Pedigree, MSS., T.C.D., F. 2-23, p. 95.

Fabric.—A long building about 65 feet by 28 feet wide, with three rooms and the remains of a fourth and western.

382. ROBERTSTOWN (10). Marked. 1222-30 The C. of Robert Guher or Gore (C.S.P.I.). It is often named in church lists and rentals, 1302, 1410, 1452. In 1289 Jo. Guer held Kyldrumyn (Plea R., 13). In 1298 Margery Gore held a half townland of Robertstown (C.S.P.I.). In 1452 Castro Robti. Gore held by Earls of Desmond. 1569 Surrendered. 1571 J. Mac Clanchy held it (Fi. 3842; Inq. Exch.); 1587 W. Trenchard (Fi. 5078; Inq. Exch., 41). 1608 Ballyrobert C. conveyed by Jas. Wakeman to Sir Ric. Wingfield, of Smithstown, with a water mill, Carricke O'Ruderi, Ardenere,¹ and part of estate of Teige mac Clansie, slain in rebellion (Rev. Exch., 1613-18, p. 1; 1623, p. 17; Inq. Chan., 6B), who held it with Cragg, 1638 (Inq. Chan., C.S., p. 94, &c.). 1655 C. of Robertstown, Carrigenrudderi, mill, &c.

Fabric.—The north-east fragments of a peel tower, featureless, save for ambreys, on a projection in a tidal creek. Fragments of a strong wall across the neck of the peninsula.

383. CRAGGS (10). Not marked. Doubtful. 1298 Crag in Shanid Manor paid 10 m. yearly (C.S.P.I.); very possibly the present Dysert C., which see.

384. DYSERT (10). Marked. Probably included Morgans and Craggs at one time. Discart Murdebrair in Ui Chonail Gabrai (Cal. Oenghus), Disuirt Murdewar, 1201; Dissert Marrgeoin, 1336. 1584 Morris mac Tirrelagh Mac Moryertagh (O'Brien) held the Isles of Arin, near Galway; Crag mac teigh, near Dissert, in Conyllagh (Inq. Exch., 12, p. 270; Peyton, 187). 1600 Jas. Gould held at his death Craige and Disertbargeon from the Bishop (Inq. Exch., Vis. Reg.). 1608 J. Wakeman held them, as estate of Teige Clansie, attainted (Pat. R., Rev. Exch., 1613-18, &c.). 1638-1655 Wingfield held Craige and Dissert C. (C.S., 95): see Morgans, *supra*, 298.

Fabric.—A tower 19 feet by 13 feet, inside; walls, $4\frac{1}{2}$ feet thick. It is four stories high, with a barrel stair of sixty-eight steps north-west beside the door, the latter protected by a "murder-hole." The lower and third story are vaulted, with a closet in the wall on the second floor. The details are of the later fifteenth century. There are slight traces of a side wing and bawn, all much injured (O.S.L., 8, p. 17).

¹ The "Churchfield," in Ardiniere, commemorates the old Church of Ardinuir, 1200. See Proc. R.I.A., vol. xxv. (c.), p. 396.

KILMOYLAN.

385. SHANACLOUE. Unknown. Perhaps Sheniclou, 1452 (Rental). 1583 Currickye or Shancloue C., in Kilmoylan (Des. R., 11), given with Ballyhahell and Knocknegornagh.

386. CARROWNECLOUGHY C. Unknown. In Toghe Shanid, near Shanid (Peyton, 99B). Perhaps same as last, and Carrowclogh, near Old Abbey, or Quarterclogh, in the same.

387. SHANID (19). Marked. 839 Senati, the scene of a fierce battle and defeat of the Norse by the Ui Chonaill and Ui Fidgeinti (Wars of G. and G.). 1230 Senode granted to T. f. Maur. 1282 J. f. F. at his death held a cantred in Cunyl called Shenede. 1296 The free tenants figure in a suit of Maur. de Carreu and Ric. de Burgo (Plea. R., 27-32). 1298 The Inquisition on the death of T. f. Maur. gives Senede, and mentions "five acres held by the Smith near the C." Also rents, a warren, a mill, and the Bishop's rent for lands held by the nuns of (St. Catherine's, or Old Abbey) O'Conyll. 1300 The Manor, worth £36 14s. 2d. (also see C.S.P.I.). During the next three centuries it was the "chief house" of the Desmonds, whence the battle-cry, "Shanid Aboo." 1569 The C. surrendered. 1580 Pelham camped near "Desmond's first and most ancient house of C. Shenet," and from it ravaged the hills, burning houses, and slaying 400 persons (Carew MS.). 1583 Manor of Shanet, two old ruinous C.s, of which one is situated on the top of a high mount, and is girded by a barbican, which, with the C., lately fell (Des. R., 11). 1587 Granted to W. Trenchard, both Higher and Lower Shanyd (Fi. 5078; Inq. Exch., 41). 1598 Left to the Irish. 1611 Confirmed to F. Trenchard, under whom Jasper Loe held both C.s, being sufficient dwelling (Inq. Chan., 6B). 1615 Claimed by the Bishop, but set to Mr. Trinche(ard) (Vis. Regal). 1641 Mortaugh Cavanagh and Col. Morris Harbart, both of Ballingarry, pillaged Shanatt (held by Donnell Whitlo) and Shanagolden (Dep., 226). 1655 J. Trenchard held the Manor in right of his brother Edward.

Fabric.—The C. stands on a fine mote 35 feet high, with a fosse 12 feet wide. On this stands a strong tower 35 feet high, 22 feet inside, walls, 11 feet thick, polygonal outside, circular inside, battlemented, windows turned over planks, and no vaults. The eastern half levelled. It is at the west side of the platform, and is nearly touched by the outer wall; of this only a few fragments totter on the edge of the mound. It was battlemented and loopholed, 16 feet high and

5 feet thick. The area is 63 feet across; the mote 170 yards round the base. To the east is a bawn down the slope and girt with fosse and mounds. A large early rath lies on the south ridge of the hill.¹

388. SHANID LOWER (19). Site marked. 1583 Another C. is situated near the foot of the hill to the north-west. It is square, 50 feet wide outside the walls, and 30 feet wide. "In which C. or peel were five separate rooms or chambers and two 'stories'; all the roofs entirely gone" (Des. R., 11). Fitzgerald gives a legend, similar to that of Dido and the hide, as to how MacSheehy lost it (i., p. 365). It is nearly levelled.

DUNMOYLIN.

389. DUNMOYLIN (19). Not marked. 1299 Dunmolyn held by Raymond de Valle (Wall) (C.S.P.I.). 1568 Wall, or Falltach,² of Dunmaoilin, fell in a raid in Kerry (A.F.M.). 1569 It surrendered to the Crown. 1580 After the fall of Askeaton, Pelham slew Ulick, son of Ulick Falltach, of Dunmaolin, who had been blind from his youth (A.F.M.). 1581-3 Hugo Falltach, or Wall, held the "great C. in a great enclosure or balne" built for defence, with a stone wall, very ruinous, a garden, water mill, and a little close in decay (Des. R., 68B). 1588 Ol. Stephenson³ was granted Don Melline, part of estate of Ullick de Wall, *alias* the Falltach (Fi. 5242). 1600 The Falltachs were given as hostages for the Sungan Earl to MacCarthy (Pac. Hib., i., p. 103; Peyton, 93B; Inq. Exch., 11). 1617⁴ Ol. Stephenson died at Dun Moylin (Inq. Chan., 14B, 20B, 24B); confirmed to his son Ric. (Pat. R., Inq. Chan., Car. I., 206, &c.). 1653 G. Aylmer paid £46 for hay for horses of the garrison at Doonmoylen (Acet. R., 8). 1655 The late estate of R. S. granted to S. F. Chamberlain (B.D. 22; C.S., p. 85; D.S.B., 3). 1661 The loyalty of Marg. Stephenson, widow, of Dromoylin,⁵ attested by her son Lt.-Gen. J. Barry (C.S.P.I., 1660-2). 1670 Confirmed to Sir T. Chamberlain (Act Sett.).

390. MONYMOYHILL or GORTADROMA (18). Marked in the Castle quarter of Gortadroma, on the White River. Sometimes called "Moyreen" C. 1289 Ad. Fleming gave Crosdere and Moyreyne

¹ See plan of Castle, Plate XVIII, and R.S.A.I., vol. xxxiv., pp. 320-338.

² Only for the Irish form "Faltach," one would suspect the "Walls" of being Ui Mhailles, for in 1336 Tho. de Valle held Crew Ymaille under Bishop Rupefort.

³ For the Stephensons, see R.S.A.I., vol. xxxiv., p. 129.

⁴ The Inquisitions, however, give divergent dates for his death.

⁵ The editor wrongly identified it with Dromoland in Clare, despite the words "Co. Limerick."

(except Lysgesy, Lysnefant, and Clotherbarwan) to Rob. Maunsel while T. Underwood by charter granted Rathbrile, in Moyrene, in offerigus to H. Capella (Plea R., 13, m. 8 and 14, m. 11). 1583 Moneymoyhell, ruinous C. (Des. R.). 1615 Held by Ol. and, 1623, by Ric. Stephenson (Inq. Exch., Car. I., 91; Inq. Chan., 15B, 20B, 24B, ix., 86). 1655 Granted to Brook Bridges and J. Bourke (B.D.; D.S.B., 3; C.S., p. 85). 1665 To Ol. Lambert. 1688 Forfeited by N. Burke.¹ 1726 Rob. Morgan,² of Connegarr, mortgaged part of J. Burke's lands of Munnymoehill (Dub. Reg., 51, p. 217).

Fabric.—The walls stood in 1840; and Mr. G. Morgan found vaults under it. A fragment with traces of a side turret remain.

391. DOONCAHA (19). Not marked. 1657 The C. shown. (D.S.B., 3). 1655 Ric. Stephenson had held Down Cahie (C.S., p. 85). A doubtful site.

SHANAGOLDEN (PART).

392. KILCOSGRAVE (19). Marked. 1299 The heirs of W. Rothdean under T. f. Gerald held Kilcosgrau; the rabbits in its warren were destroyed by foxes (C.S.P.I.). 1452 Kilcosgrau held by the Earls of Desmond (Rental). 1583 Kilcosgrave vill. and C., Ed. og London (Des. R., 19B; Peyton, 192B; Inq. Exch., 54). 1587 Grant to W. Trenchard (Fi. 5078), and 1611 to his son F. Trenchard, who had leased it to Ric. Gyll. The C. was a sufficient dwelling (Inq. Chan., 6B). Francis held it. 1657, his daughter married Cap. J. Coplen, and their son J. married, 1677, Susanna Langford, and left the place by will, 1719, to her nephew, whose descendants hold it.

Fabric.—In 1840 the O.S. writers say that the house was on the site of the C. which no one remembered as standing. In fact, the foundations remain near the house.

393. CRAGGARD (19). Not marked. A small peel tower on the Fox Covert Hill; its site is remembered. It is shown on a map of 1750.

¹ Jas. and J. Morgan, of Moyreen, by deed 1731 (Dub. Reg.) granted part of J. Burke's part of Moneymoehill which they held from Lord Carberry, assignee of N. Burke, of Cahir Meahell, deceased, otherwise under J., son and heir of Nic. Bourke.

² The family of Morgan, now of Old Abbey, see R.S.A.I., vol. xxxiv., p. 50. They claim descent from Sir Ed. Morgan, of Llantarnam, Wales.

RATHRONAN.

394. CAHERMOYLE (28). Not marked. 1299 Rathronan held by Robert Purcell under T. f. Gerald (C.S.P.I.). 1317 Cahiryomusly held, with the hamlets of Ballymonyn, by Gilb. de Burgo (Mem. R., m. 44). Edm. Hubert held it about 1550. 1583 His son Morris gave it to his younger son Gerrot (Rev. Exch. Ord., Cal. i., p. 57). C. held by a Garret Harbert in 1609 and 1637 (Inq. Chan., 51B; and Car. I., 199). 1655 Cahir mo Eaghill, or Cahermeghill, in Rathronan, Jas. mac Shane (C.S., p. 83; D.S.B., 3). Cahirmeaghill, estate of Sir Dan. O'Brien, confirmed to him and Sir T. Southwell (B.D., 22d). Dr. Joyce derives name from Cathair Meathail, 'fort of the soft land' ("Irish Names," ii., p. 465).

395. BALLYVOGHAN (28). Marked. 1582 Edm. f. Morrice Hubert, of Balivochan, pardoned (Fi. 3842). Ger. Hurbert rebelled with Desmond (Inq. Exch., 54; Peyton, 113B). 1611 Held by Ol. Stephenson, who enfeoffed Jas. Walsh and others in trust (Inq. Chan., 55, ix., 62). 1633 T. Stephenson, of Ballywoghan, died¹ (Funeral Ent., v., p. 38). 1655 Late estate of Ric. Stephenson (C.S., p. 84). 1736 Rob. Morgan, of Callow, leased land to Ric. Stephenson, of Ballywoghan (Reg. Dub.).

Fabric.—A tower 24 feet by 19½ feet, walls 5 feet 8 inches thick, with an under-vault, and 25 feet high. It was locally Baile ui Buadachan in 1840 (O.S.L., 9, p. 74), suggesting the ancient name Buadhachan² occurring among the Eoghanachts. The older form, however, suggests the "Vaughan" family. Morrish Moghan or Vaughan was of Kilbradran, 1619 (Inq. Chan., ix., 67). A family named Boohen recently lived in Kilmeeady.

396. BALLYEGAN. UNKNOWN. Given as in this parish with last in O.S.L. (9, p. 74), and separately from Ballyegny (*Ib.*, p. 166). It closely resembled Ballyvoghan in size and remains.

ARDAGH.

397. ARDAGH³ (28). Marked on the key map only. A doubtful site. 1201 Ardachad claimed by the See of Limerick (B.B.L., p. 14).

¹ R.S.A.I., vol. xxxiv., p. 130, variant dates for his death, but probably March, 1633. He left a son Ric., aged nine.

² For example, the father of King Ceallachain Caisil.

³ See Proc. R. I. A., xxv. (c.), p. 401.

1252 Vis. Capt. concerning a manslaughter near Ardach (Plea R., m. 3d). T. de Mid. claims a burgage in Ardach from Petronil, dau. of David Bale (*Ib.*, m. 5). 1289 Rad. f. Andrew agrees with the Bishop as to lands in Ardach (*Ib.*, 13, m. 21). 1295 Roger de Lesse, the Sheriff, broke the chamber of J. le Whyte, of Ardach, and took ale and paid nothing for it (Just. R. Cal., p. 52). It was a manor of the Bishops, held in 1336 with Kyllachtyn (Rental). 1452 The villat of Ardagh, with Ballyduffgyn and the tenement of Rob. Lowell, worth 36s. 4d., of which 26s. 8d. was payable to the Bishop (Rental). 1583 Nearly the whole Toghe of Ardagh was held by the Crown (Peyton, p. 180B). 1583 Ardagh paid Sorrohen for 24 galloglas for 8 days yearly to Desmond, worth £3 and 9 cows (Des. R., 41). 1615 It was claimed by the Bishop, but was held by Capt. Eyne Cullam (Vis. Reg.).

UNPLACED CASTLES IN CONNELLO.

398. CRAGHAN C., named by Capt. J. Ward among the C.s in Connello, surrendered to the Government in the war of 1569 (C.S.P.I., vol. xxix., No. 68). 1583 Craggan C., Co. Limerick, held by Philip Supple, given after Kilmacoe and before Ballincolly and Ballyegny (Inq. Exch., 10, 11). See also 49.

399-400. The RALFF (? RATH) and BALDON. Other C.s in Connello surrendered in 1569.

401. BALLYENMAING C., near Finnitterstown, in Kilfinny parish, 1583 (Peyton, p. 190).

402. "C. LAOHAR," in Connello C., 1590 (Hardiman Map, 2).

403. KNOCKNEGOUNAGH C. only named in Inq. Exch., 54. Temp. Elizabeth.

404. LACKAREWNY-KNOCKAN C., 1583 (Fiant 4694). See 328.

405. CASTLEKEOUGH. 1611 Sir E. Fisher was granted the C.s of Rathmore, Castlekeough, and Knocker (probably Nieker), Lisdonan, and Ballincourtye, estate of Conor O'Brien (Pat. R.).

PART 1.

Barony	Total	Chief Castles	Peel Towers	Same with Bawns	Simple Bawns	Round	Sites or fragments	Re-corded	Sec-tions
Limerick City,	23	1	1	—	—	—	3	18	1
Clanwilliam, .	56	2	8	—	1	1	8	36	24
Owneybeg, .	7	—	—	—	—	—	—	7	80
Coonagh, .	17	—	4	—	—	—	6	7	87
Parts now in Tipperary, }	2	—	—	—	—	—	2	—	104

PART 2.

Pubblebrian, .	35	1	2	—	—	—	2	30	106
Kenry, . . .	25	—	2	4	1	—	1	17	141
Coshmagh, .	31	2	7	1	1	—	3	17	166
Parts now in Cork,	1	—	—	—	—	—	—	1	196
Small County,	39	2	4	2	—	—	10	21	197
Kilmallock, .	19	1	—	—	—	—	1	17	236
Coshlea, . .	27	—	7	—	—	—	8	12	255
Unplaced, .	9	—	—	—	—	—	—	9	282

PART 3.

Connello Lower,	41	1	9	6	—	—	7	18	291
„ Upper,	25	—	7	1	1	—	4	12	332
Parts now in Cork,	3	—	2	—	—	—	1	—	357
Glenquin, .	14	1	5	—	—	—	2	6	360
Shanid, . .	24	2	3	—	—	—	8	11	374
Unplaced, .	7	—	—	—	—	—	—	7	398
Total, . . .	405	13	61	14	4	1	66	246	405

CONCLUDING REMARKS.

This survey having run to such a length, it seems best to hold back the fuller architectural notes and the history of the Castles from 1530 to 1690. Another intended appendix on the early families has been embodied more briefly as notes and additional matter in the two later portions of the paper. The substitution of an index of family names will more than supply its place. The occurrence of the oldest Norman names among the present peasantry is very interesting. In the treatment of the material, a few points arise. The too common gap in the records of the Castles between 1390 and 1560 is probably a less serious loss than any other period of equal length. All our existing material¹ shows that time to have been one of comparative quiet and prosperity in County Limerick; and the fact of so many families, which appear as holding the lands and castles in 1390, holding the same lands in the time of Elizabeth, renders it certain that the loss is rather to the genealogist than to the historian. The period is comparable to that between the sales of 1703 and those of the Encumbered Estates in 1858.

That there is no "Castle Founders' List" for County Limerick, is a great loss; but that list for Clare enables us to date the style and ornament of the peel towers of both counties with fair accuracy.

The length of time over which the collection of these notes extends renders it hard to verify them in all cases, though the original notes are minute. It is, I fear, too possible that misconceptions and mistakes may be found in so large a mass of facts dealing with over 400 sites. In giving the references to the Castles in the Ordnance Survey Letters, I do so for reference to those valuable sources, but have tacitly added to and corrected their material. The authors of these letters are wonderfully accurate, despite their manifest (and often confessed) ignorance of architecture; much to their credit, it rarely vitiates anything save a theory as to date. The description of complex castles (like Adare and Carrigogunnell) was entirely beyond their power, and not attempted by them on that account. Their conclusions as to the names were largely based

¹ We may still hope that some day the lost documents of the Desmonds may be recovered. A number were taken by the English after the capture of Rathmore, and the Revenue Exchequer Orders (1613-18, p. 24) show that in 1615 litigants were able to search in the "Writings and Evidents of Gerald Earl of Desmond" for material relating to estates in Co. Limerick.

on the modern Irish, sometimes on the few local names preserved in the Annals, never on the most important mediæval records; so it evidently is no slur even on the great name of O'Donovan if modern workers do not let themselves be overborne in all cases by the decisions (sometimes very hasty, and even subsequently contradicted by the authors themselves) as given in the "Letters."

It may also be pleaded how very little has been done by previous workers in the district to throw light on the Castles. Grose,¹ Fitzgerald,² and Lenihan³ rarely give more than brief, general, sporadic notes. The Rev. James Dowd was the first to give us fuller material⁴ for the general study of the Castles. In "Memorials of Adare," Lady Dunraven gave an excellent description of Adare, of which Castle Mr. George Hewson gave another⁵ more critical account. Add to these Lady Dunraven's notes on Dunnaman, Fitzgerald's on Shanid, and our own on Askeaton and Carrigogunnell,⁶ and the bibliography is practically exhausted.⁷ May I hope that I may be forgiven the faults of a pioneer in this survey, and that it may lead to a series of fuller descriptions by local workers, at least for the more important castles and better preserved peels? All who have worked on such subjects and know their difficulty will forgive errors in the present writer; but I hope they may publish the corrections whenever a material error is detected.

It remains to thank the same kind friends whose help I acknowledged in the Survey of the Churches—especially Mr. M. J. MacEnery

¹ Grose, "Antiquities of Ireland" (1795), vol. i., Adare, p. 26; vol. ii., Carrigogunnell, p. 28; Cullum, p. 70; Askeaton (called Rockbarkeley), 71.

² Fitzgerald and Magregor, "History of Limerick" (1827), especially vol. i., pp. 227-391; vol. ii., p. 592.

³ Lenihan, "Limerick: its History and Antiquities" (1866), especially pp. 722-736.

⁴ "Round about the County of Limerick." The fuller descriptions include Kilmallock, p. 11; Bruree, p. 61; Lough Gur, p. 70; Rathkeale, p. 166; Pallas, p. 171; Askeaton, p. 182; Glin, p. 198; Shanid, p. 200; Newcastle, p. 211.

⁵ Journal, Limerick Field Club, vol. i., part i., p. 32; part ii., p. 19.

⁶ Askeaton, R.S.A.I. Journal, vols. xxxiii., xxxiv. (1903-4); Carrigogunnell, "Principal Castles of Limerick," 1906-7.

⁷ We may add the account of Desmond's Castle, Adare, and of Carrigogunnell, by Miss Adams (with views by Very Rev. L. O'Brien, Dean of Limerick), in "Castles of Ireland," and some notes on details of Askeaton Castle in the *Gentleman's Magazine*, vol. xvii. (2), 1864, p. 544. A fine view of Carrigogunnell has recently been published by Rev. J. Begley in "The Diocese of Limerick, Ancient and Mediæval," which has reached me too late for more than this reference.

and Dr. George Fogerty. Professor John Wardell, Mr. J. G. Hewson, Mr. James Hewson, and Dr. Henry Molony have helped me in the Connello Castles, and Mr. Grene Barry in those of Clanwilliam and Coonagh, and with many lesser notes. Sir Arthur Vicars, in giving me access to the records of the Ulster's Office; Mr. George Dames Burtchaell, for his valuable help and suggestions as to families; Mr. James Mills, the Deputy-keeper of the Records; and Mr. Henry Berry, have laid me under a renewed debt of gratitude by their help in work necessary for supplementing and revising these notes on the Ancient Castles of the County of Limerick.

CORRIGENDA AND ADDENDA, PART III.

No. 23. *For* "Anstoe," *read* "Ansloe."

No. 128. Ballyclough: one wall of the castle was embodied in the modern house.

No. 106. *For* "Teige na Glenore," *read* "Conor Prince of Thomond who abdicated in favour of Teige na Glemore, 1426," *and add* "His son Brian Duff was settled in the wasted 'Fossagh Lymerey' by James, Earl of Desmond, and given Carrigogunnell in 1449" (Peyton, 33B; and Mulchonaire's Book).

No. 122. *For* "Anstey (Fi. 5347)," *read* "Ansley (Fi. 5363)."

No. 122. Corbally: Mr. Grene Barry considers that these entries (save 1618) refer to another Corbally, and that the latter is merged in Ballinacurra (126), once Curraghbally. However, the castles of Corbally and of Dwylish or Beallancor seem to be distinguished. The entry in the Desmond Roll (m. 7) is so equivocal as to leave it doubtful whether the castle was near the city walls to the north-east or the city to the north-east of it. On going over all the authorities, I incline to the belief that Mr. Barry is right as to its position near Courtbrack, but that it is not Ballinacurra Castle, and that there may also have been a castle at the north-eastern Corbally, Corbally Castle being placed in Clanwilliam by Peyton, p. 24, and the Desmond Roll at least permitting this view.

No. 131. Ballyregan. *Add* "1289 Suit of R. de la Louwe and H de Lexton as to dower in Ballyregan (Plea R., 13, m. 9)."

No. 210. *For* "Bruree" *read* "Bruff."

PLATES.

- XVI. Castles of Cappagh (308); Ballingarry (335); Lisnacullia (310); Clonshire (329); and Askeaton (291).
- XVII. Details of Castles: *Windows*—Adare (thirteenth century), Lisnacullia and Askeaton (fifteenth century), and Dunnaman (probably early sixteenth century). *Mouldings*—Adare. *Staircase*—Lisnacullia.
- XVIII. Plans—Askeaton Castle (1199–1460); Shanid (thirteenth century); and Cappagh, peel tower (*c.* 1440, 1460), and Bawn (*c.* 1580).

INDEX OF PLACES.

“Int.,” Introductory sections (after III., they precede the section number here given); “n.,” note; “Add.,” refers to addenda and corrigenda at ends of Parts II. and III.

(Part I. contains 1 to 205; II., 206 to 290; III., 291 to 404.)

- Adamstown, 221.
 Adare, 166.
 Amery Castle, 288.
 Aghacore: see Boynogh.
 Aherloe: see Galbally.
 Amogan, 328.
 Annagh, 83.
 Annaghrosty, 138.
 Aney: see Knockaney.
 Aqi: see Knockaney.
 Arabreaga, 93.
 Ardagh, 397.
 Ardgowle more and begg, 304-5.
 Ardlahan, 161.
 Ardpatrick: see Knockpatrick.
 Ardskeagh: see Brickfield.
 Arrybreaga: see Arabreaga.
 Askeaton, 291-2.
 Askelon: see Esclon.
 Ashfort: see Annaghrosty.
 Ashill Towers: see Castlecoote.
 Athlacca, 181.
 Attyfin, 134.
 Aughinish, 381.
- Baile Ui Ghealachan: see Hollypark.
 Baggotstown, 217.
 Baldon, 400.
 Ballinacourty, 270.
 Ballinacurra, 126.
 Ballinacurra (Croagh), 323.
 Ballinagarde, 46.
 Ballinagoole, 148.
 Ballinahinch, 272.
 Ballinamonabeg and more, 222-23.
 Ballinard, 231.
 Ballinarooga, 348.
 Ballincollo (-ruo), 190; (Ballingarry), 338.
- Ballincurra, 182.
 Ballindrowite, 267.
 Ballinfrankey: see Frankfort.
 Ballingarry (Connello), 335-8; (Coshlea), 273.
 Ballingoody: see Baggotstown.
 Ballingowle: see Ballinagoole.
 Ballinlough, 234.
 Ballinoe: see Bruree and Newtown; (Clonelty), 366.
 Ballinort, 295.
 Ballinscoola (Ballinskowligg), 228.
 Ballinvealla, 136.
 Ballinvira, 326.
 Ballinvogodock: see Baggotstown.
 Ballinvoher, 142.
 Ballinwily: see Carrigparson.
 Ballinwryg, 326.
 Ballyatheney: see Fanningstown (Croom).
 Ballyallan, 319.
 Ballybenoge: see Maidstown.
 Ballybooly: see Boulabally.
 Ballybeg, 109.
 Ballybricken, 52.
 Ballybrowne, 37; (Clarina), 118.
 Ballycahane, 130; (Kenry), 150.
 Ballycahill, 227.
 Ballyclogh (Clanwilliam), 32; (Connello), 301; (Pubblebrian), 128.
 Ballyculhane (Kildimo), 160.
 Ballycullane (Coshlea), 259.
 Ballycullen (Askeaton), 300.
 Ballyduff, 276.
 Ballyea, 202.
 Ballyeaghera, 112.
 Ballyegan, 396.
 Ballyeghtra, 107.
 Ballyegny, 311.

- Ballyengland, 296.
 Ballyenmaing, 401.
 Ballyfoleen, 333.
 Ballyfraley, 363.
 Ballyfrankey : see Frankfort.
 Ballygallyhannan (Ballygellighan) : see Glin.
 Ballygleaghan, 145.
 Ballygrennan, 10 ; (Small County), 188.
 Ballygubba, 193.
 Ballyguilleataggle, 333.
 Ballyhyward : see Adamstown and Howardstown.
 Ballyloske : see Garranroe.
 Ballymacreese, 56.
 Ballymacshaneboy, 264.
 Ballymorrisheen : see Callow ; (Grange), 364.
 Ballymurely : see Maryville.
 Ballymurphy (Murchada), 137.
 Ballynagoole, 327.
 Ballynacourty (Darragh), 270.
 Ballynanty, 20.
 Ballynash, 294.
 Ballynaughte : see Bruree.
 Ballynecarrigy : see Rockstown.
 Ballyneety (Cahernarry), 39 ; (Coonagh), 103.
 Ballynogert : see Ballinagarde.
 Ballypierce, 362.
 Ballyregan, 131 ; Add. III.
 Ballyscadden, 274.
 Ballyshane, 129.
 Ballyshida, 40.
 Ballyshonickbane : see Carriganea.
 Ballysimon, 34.
 Ballysiward : see Howardstown.
 Ballysteen, 143.
 Ballytrasna, 101.
 Ballyvalode, 96.
 Ballyvarra, 28.
 Ballyvenoge : see Maidstown.
 Ballyvaghan, 395.
 Ballyvollane, 25.
 Ballyvorheen, 85.
 Ballyvorneen, 68.
 Ballywilliam, 321.
 Ballywillen : see Milltown ; (Clanwilliam), 47 ; (Connello), 365.
- Ballywollen : see last.
 Barniard, 108.
 Beagh (Iveruss), 141.
 Bealeruffyn : see Ballyvorheen.
 Bean : see Mayne.
 Bearnan (aguivy) : see Tonbawn.
 Behiz, 151.
 Black Castle (Gur), 211 ; (Caherelly), 51.
 Blathac, 11.
 Bodestock : see Woodstock.
 Boherbradagh, 330.
 Bolane, 163.
 Boulabally, 168.
 Bouchier's Castle : see Lough Gur.
 Boynogh, 80.
 Brickfield, 261.
 Briskaghbeg, 117.
 Brittas, 73.
 Brohill, 357.
 Broskeagh : see Briskeagh.
 Brownstown : see Court Browne.
 Bruff, 186.
 Bruree, 354-5.
 Bulgaden (Eady), 256 ; (Fox), 255.
- Caherass, 176.
 Caheravally, 45.
 Caherconlish, 61, 62.
 Caherconreiffy, 75.
 Caherdavin, 13.
 Caherduff, 116.
 Caherelly, 50, 51.
 Caherguillamore, 208.
 Caherhussok : see Ballinard.
 Cahermoyle, 394.
 Callahintroy : see Castle Troy.
 Callow, 303.
 Camas, 206.
 Carnkittle : see Carrigkittle.
 Cappaculleen, 82.
 Cappagh, 308.
 Carriganea, 154.
 Carrigareely, 72.
 Carrigbeg : see Knocksentry.
 Carrigkittle, 235.
 Carrigogunnell, 106 ; Add. III.
 Carrigparson, 58.
 Carrownecloughy, 386.

- Carrownemona, 379.
 Cashlaun-na-Corran, 21.
 Caslen Uilchin: see Castle Wilkin.
 Castle Amery, Aqi, Behiz, &c.: see Amery, &c.
 Castlelake: see Farrenshone; —cluggin, 95; —comfort: see Farnane; —connell, 24; —coote, 254; —creagh, 280; —crome, 349; —croyne, 349; —curricky, 336; —currin, 349; —erkin, 70; —farm, 225; —field: see Ashfort; —garde, 97; Grey, 152; Hewson: see Ballyengland; Ievers: see Tullerboy; —jane: see Ballyscaddane; —kippen (Croom), 174; —keough, 405; —knock, 64; —laghie, 285; Lloyd, 90; —lishen, 359; —loaghny, 105; —lynum, 282; —maemorris: see Kyletaun; —mahon: see Mahoonagh; —matrix, 314, 315; —morrishen: see Ballymorrishen; —mues, 286; —Mungret, 122; —oliver: see Cloghnodfoy; Park: see Ballygrennan; —rag: see Ballygarry, 337; —robert (Adare), 169: see also Cloghnarold and Robertstown; —town (Coonagh), 88; —town (Conyers), 353; —town (Kenry), 144; —troy, 30; Uilchin or Wilkin, 71.
 Clarina, 111.
 Cleur Jeolaghan: see Ardloghan.
 Charabud: see Corrabul.
 Clogh (Croagh), 324; —aderreen: see Pallas Grean; —adoularty, 200; —atacka, 121; —atrida, 316; —aviller, 232; —dalton: see Castle Lloyd; —keating, 124; —kotred: see 324; —monohy, 226; nadro-min, 79; —narold, 309; —nodfoy, 268; —pollard or —flordy: see Pollardstown; —tacka (not Clogh-atacka), 286.
 Clondrinagh, 14.
 Clonecanane, 15.
 Clonkeen, 60.
 Clonmackenmore and beg, 17, 18.
 Clonoguillen: see Kilsannell.
 Clonshire, 329.
 Cloubonge, 289
 Coalick, 199.
 Cnoc-ivr-finty: see Knocksentry.
 Coolyhenon, 35.
 Coonagh (Limerick), 19.
 Coonagh, or Oeconagh, 87.
 Corbally, 122; Add. III.
 Corbally (Clanwilliam); Add. III.
 Corcomohide: see Castletown Conyers.
 Corgrig, 380.
 Corrabul, 140.
 Correen: see Coonagh.
 Cortenaytowbrite: see Gortnatubbrid.
 Court, 162.
 Courtbrack, 23; —browne, 293; —meanes, 375; neruddery, 253.
 Craig: see Dysert.
 Craigard, 393.
 Craggs, 383.
 Craghan, 398.
 Creggane (Hakmys), 189; Pubblebrian, 125.
 Crewmally: see Ballinaclogh.
 Croagh, 322.
 Cromwell, 234.
 Croom, 173.
 Cullam, 164.
 Cullen (-awonagh), 104.
 Curragh-chase, 157; Elltine, 26; —gower, 9; —north: see Ballygleaghan.
 Currickye, Shanaclone, 385.
 Dadrienarry: see Ballygarry.
 Darragh, 270.
 Darranstown, 269.
 Deelish: see Ballinacurra.
 Derreen, 153.
 Derryknockane, 127.
 Doneskeagh, 284.
 Donygalyn: see Ballyfraley.
 Dooneaher, 391.
 Doondonnell: see Cloghnarold.
 Doonmoon: see Ballinabinch.
 Doorlus, 347.
 Dorosty: see Parosty.
 Dromard, 318.
 Dromassil, 139.

- Drombanny, 42, 43.
 Dromkeen, 76.
 Dromlara, 98.
 Dromloghan, 147.
 Dromroe (Shreelane), 31.
 Dungrot, 278.
 Dunkip, 172.
 Dunmoylan, 389.
 Dunnaman, 175.
 Duntrileague, 279.
 Durraclogh, 345.
 Dysertmorgan, 384.
 Ederryloghan : see Ardloghan.
 Effin : see Brickfield.
 Ellton, 214.
 Elm Park : see Kilnecally.
 Englandstown : see Ballyengland.
 Esclon, 119.
 Fanningstown (Croom), 167 ; (Fedamore), 203.
 Fantstown, 257.
 Farnane, 81.
 Farranshone, 11.
 Farrantegin : see Rathnasaer.
 Fedamore, 198.
 Fenure, 115.
 Finnitterstown, 334.
 Foynes, 377.
 Frankfort, 344.
 Galbally, 277.
 Garranballaghanoo, 149.
 Gardenfield : see Muskrynoonan.
 Garranroe, 171.
 Garraunboy, 331.
 Garrod's Island (Lough Gur), 212.
 Garryellan, 201.
 Garryfine, 356.
 Garrynlease, 266.
 Garryscullibine, 220.
 Gibbonstown, 260.
 Glennahaglish, 275.
 Glenogra, 207.
 Glenquin, 372.
 Glin, 374.
 Gormanstown, 219.
 Gortadroma : see Moneymoyhill.
 Gortanea : see Carriganea.
 Gortnegworra, 320.
 Gortnetubbrid : see Springfield.
 Grange (Rathkeale), 361 ; (Lough Gur), 209.
 Greenan, 65.
 Greenanebegg, 66.
 Hakmys : see Creggane.
 Herbertstown, 233.
 Hollypark : see Ballygleaghan.
 Hospital, 225.
 Howardstown, Bruree, 185.
 Hubertstown : see Herbertstown.
 Illan-Ivowanna : see Cloghkeating.
 Inch St. Lawrence, 53.
 Iniskefty : see Askeaton.
 Islandmore, (Kenry), 155 ; (Croom), 177.
 Iveruss : see Beagh.
 Johenishesgrene : see Tough.
 Jolegar : see Uregare.
 Jyskyfty : see Askeaton.
 Kenry : see Shanpallas.
 Kilbehenehy, 281.
 Kilbigley : see Brickfield.
 Kilbolane, 358.
 Kilcosgrave, 392.
 Kileullane, 229.
 Kileulline, 55.
 Kilderry, 133.
 Kildonnell, 132.
 Kilduff, 99.
 Kilfinnane, 265.
 Kilfinny, 332.
 Kilfrush, 218.
 Killalough (Lough Gur), 211.
 Killeedy, 371.
 Killonan, 29.
 Kilmacluana : see Cappagh.
 Kilmacow, 342.
 Kilmallock, 236-253.
 Kilnecally, (Elm Park), 110.
 Kilpatrick, 36.
 Kilpeacon, 197.
 Kilscannell, 312.
 Kilwirry, 146.

- King's Island, 22.
 Kishiquirke, 78.
 Kislaneyconnell: see Castleconnell.
 Knightstreet: see Ballingarry
 (Connello).
 Knockardnegal, 11.
 Knockaderry, 367.
 Knockanea, 67.
 Knockaney, 215, 216.
 Knockedanna, 63.
 Knockesawny: see Knocksouna.
 Knockfennell, 213.
 Knockfookaun, 283.
 Knockgromell: see Cromwell.
 Knocklong, 271.
 Knockmony, 226.
 Knocknegorteeny, 84.
 Knocknegowna, 403.
 Knocknenagh: see Knockanea.
 Knockpatrick, 378.
 Knockroe Mason, 54.
 Knockrunyn, 114.
 Knocksawno: see Knocksouna.
 Knocksentry, 27.
 Knockshanecashlane, 62.
 Knocksouna, 192.
 Knocktershane: see Shanpallas.
 Kyletaun, 317.
- Lackarewny Knockan, 404.
 Laohar, 402.
 Laxweir: see Cashlaun ne corran.
 Leagane, 195.
 Lickadoon, 41.
 Limerick 1: castles in city, 2, 9; in north
 suburbs, 10, 20.
 Lisduane Turret, 346.
 Lismakeery, 299.
 Lismollane, Abingdon, 77.
 Lisnacullia, 310.
 Lissamota, 341.
 Lisdrumloghan: see Drumloghan.
 Loughill, 376.
 Longford, 91.
 Longhurst: see Longford.
 Lotteragh: see Bruree.
 Lough Gur, 210-212.
 Luddenmore, 57.
- Mahoonagh, 368.
 Maidstown, 187.
 Marevrege: see Arabrega.
 Maryville, 352.
 Mattresscourt and Matrix: see Castle-
 matrix.
 Mayne, 369.
 Meanes: see Courtmeanes.
 Meelick, 113.
 Mellon: see Rinekirkye.
 Millmount, 263.
 Milltown (Askeaton), 302;
 (Ballingaddy), 262; also Ballyvullen.
 Moanahila: see Pollardstown.
 Moneymoyhill, 390.
 Morenane, 156.
 Morgans, 298.
 Mount Blakeney, 258.
 Mount Browne: see Dromard.
 Mountshannon: see Ballyvollane.
 Moyreen: see Moneymoyhill.
 Muskrynoonan, 351.
 Mungret (Castle Mungret), 123.
- Newcastle, Limerick, 33; (west), 360.
 Newtown, 120; also Ballinoe.
 Nicker, 102, 405.
 Norragh: see Kyletaun.
- Oconagh: see Coonagh.
 Offargus, Int., 291, 310 n.
 Oldcourt, 325.
 Omogan: see Amogan.
 Oola, 92.
 Owney, 79-86, Int.
- Pallas-beg, (Tough), 290;
 also 86; —Grean, 100;
 —Kenry: see Shanpallas;
 —(Kilmeedy), 350.
 Parosty, 237.
 Pollardstown, 89.
 Portrinard, 373.
 Proppinge, 252.
 Pullagh, 178.
- Quroclog: see Durraclough.
 Qwonagh: see Castletowncoonagh.

- Raheen : see Caheravalley.
 Ralff, 399.
 Rare Kenlex : see Cahirconlish.
 Rathcannon, 183.
 Rathgoghan (Cork), 196.
 Rathjordan, 74.
 Rathkeale, 313.
 Rathmore, 205.
 Rathnasaer, 307.
 Rathurd, 41.
 Rawleystown, 230.
 Reboge : see King's Island.
 Reys : see Kilsconnell.
 Rinekirk, 165.
 Robertstown, 382.
 Rochestown, 48.
 Rockstown, 49.
 Rower, 170.
 Roynekirkye : see Rinekirk.
 Rylaans, 339.
 Ryves Castle : see Ballyscaddane.
- Shanaboley, 16.
 Shanaclone, 385.
 Shanaclough : see Balingarry (Croagh) :
 see Old Court : see also Finnitters-
 town and Oola.
 Shandangan, 94.
 Shane Court : see Old Court.
 Shanepallas, 159.
 Shanid Lower, 388 ; Upper, 387.
 Shreelane, 31.
 Skool, 204.
 Springfield, 370.
 Srahane, 69.
 Sreelane : see Shreelane.
 Stoneville, 306.
- Tannacourt : see Court Meanes.
 Tankardstown, 191.
 Thomastown, 194.
- Thomcore, 2.
 Thurles : see Doorlus.
 Tinnatarriff : see Tough.
 Tobornea : see Leagane.
 Tohoride : see Tough (Adare).
 Tomdeely, 297.
 Tonbaun, 135.
 Tooreen (Carrigparson), 59 ;
 Islandmore, 9.
 Toryhill : see Dromassil.
 Tristellaueran : see Inch.
 Trostany : see Dunnaman.
 Troy Castle : see Castle Troy.
 Tough (Aesgrene), 86 ; (Adare), 158.
 Tower Hill : see Tough.
 Tullabracky, 184.
 Tullerboy, 180.
 Tullovin, 179.
- Ula and Ullish : see Oola.
 Uryverygy : see Arabrega.
- Veelish or Ullish : see Oola.
 Vicars Castle, 244.
 Vinoganbeg : see Amogan.
- Wallygard : see Ballinagard.
 Whitestown : see Ballineety.
 Williamstown, 47.
 Woodstock, 340.
- Xoghesgren : see Tough.
- Yeaghrosse : see Beagh.
 Ynyskyfty : see Askeaton.
 Yrostany : see Dunnaman.
 Ysbardeston : see Fantstown.
 Yonach : see Owney.
- Zoghesgrey : see Tough.

INDEX OF PERSONS.

Only definite surnames are given; "family" shows principal note.

- Adams, 123, 307, 376.
 Agard, 124, 234, Int., 291.
 Anevil, 218.
 Ansloe, Ansley, 41, 122.
 Ap Howell: see Powell.
 Appelgard, 137, 154.
 Apsley, 215, 225 n.
 Aradha tribe, Int., 80.
 Arthur, 2, 10, 22, 25, 31, 48, 125, 128.
 Arundel, 369.
 Aston, 143-144.
 Aunsell, 335.
 Authors—Barry, J. Grene, 49, 73, 119,
 Dowd, Rev. J., 216, 360; Dun-
 raven, Lady, 166; Fitzgerald, Rev.
 P., 62, 319, 335, 388; Hewson, G.,
 166; Langrishe, R., 210; Lynch,
 Rev. Mr., 61; Molony, Dr. H., 335,
 342; Westropp, T. J., 119, 120, 291.
 Aylmer, 265, 368, 389.
 Baggot, 38, 215, 217, 222, 223, 229.
 Bailey, 210; Bale, 397.
 Balbeyn, 2.
 Barker, 121.
 Barraby, 280.
 Barry, 347, 389.
 Bassingburn, 215.
 Bath, Earl of, 97, 112, 209: see
 Bouchier.
 Beaufort or Belofago, 119, 288.
 Belcoc, 300.
 Bennett, 279.
 Berkeley (Askeaton), 166, 291-3, 295-7,
 299, 300, 311, 322, 325, 369, 381;
 (Ballyeahane), 130, 139.
 Beston, 141, 144, 145, 149, 154, 253,
 340 n.
 Bevan, 206.
 Billingsley, 236, 265, 303, 316, 318,
 328, 332, 335, 340-342.
 Bindon, 123, 124.
 Blayney, 322.
 Bluett, 242.
 Blundell, 309.
 Blunt, 101, 328: see also White.
 Borstye, 303.
 Boskagh: see Fox.
 Bostock: see Beston.
 Bouchier, 207, 210.
 Boyle, 69, 74, 106, 120, 281, 298, 358:
 see also Cork.
 Braosa, 21, Int., 80.
 Brandon, 94, 353.
 Bridges, 296, 304, 328, 390.
 Brittas, Lord, 27, 30, 53, 62, 65, 67,
 72; family, 73.
 Broderick, 341.
 Broghill, Lord, 190, 293-4, 297-300:
 see also Orrery.
 Bromley, 370.
 Brouncker, 319, 348.
 Browne, of Hospital, 52, 172, 202, 206,
 210, 225-6, 348; of Kilcullane, 229,
 236, 308, 310, 322, 348.
 Bullingbroke, 218.
 Bultingford, 8 n.
 Burgate, 79, 131, 200, 253, 259, 277,
 278.
 Burgh, 70, 76.
 Burgo and Burke, 1, 24-38, 46-73,
 75-78, 119, 123, 127, 164, 172, 197,
 235, 279, 285, 288, 291, 308, 313,
 319, 373, 381, 390.
 Burton, family, 215, 217, 234.
 Bury and Charleville, 159, 165.
 Butler, 24, 61, 89, 91, 123, 215, 272,
 319, 342, 348.
 Byboys, 335.
 Cahill and O'Cahill, 106, 352.
 Cahiravahalla, Lords, 45.
 Canny: see MacCanny.
 Cantwell, 278-280.
 Capella and Chapelle, 189, 329, 342,
 390.
 Carew, 166, 210.
 Carter, 35, 124, 141, 163, 234.

- Casey, Cathasaig, Cahisse, 45, 183, 205, 257, 377, 380.
 Castleconnell, Lords, 24, 62, 67, 70, 124, 210.
 Cavanagh, 387.
 Ceallachan, King, 374.
 Chamberlain, 389.
 Charleville: see Bury.
 Chapman, 46.
 Chinnery, 214
 Clancy, MacClancy, &c., 27, 52, 65, 68, 296, 382.
 Clare de, 198, 210, 215, 218, 291, 312, 353, 361, 368.
 Clarina, Lords, 110.
 Clarke, 329.
 Clayton, 35, 46, 48, 59, 236, 243.
 Clifford, 215, 353.
 Cogan, 173, 191, 270.
 Collins, 86, 210, Int., 332, 335 n.
 Collum: see Cullom.
 Comyn, 11, 12, 39.
 Conyers, 353.
 Cooper, 271.
 Coote, 72, 215.
 Coppinger, 161.
 Corcoith, tribe, Int., 1 (p. 58).
 Corcomohide, tribe, 353, Int., 291.
 Cork, Earls, 141, 144.
 Cornwall, 341.
 Cosgrave, 103.
 Coterel, 322.
 Courtenay, 304, 352, 356, 360, 361, 363, 369, 373, 381.
 Craige, 69.
 Creagh, 9, 25, 42, 69, 108, 109, 122, 195, 202, 241, 262, 340.
 Creeves, 335.
 Cripps: see Villiers.
 Cristour: see Saleys.
 Crofts, 376.
 Crofton, 291, 293, 294.
 Croker, 46, 173, 230.
 Cromwell, 185; family, 234.
 „ Oliver, 281.
 Crowe, 329.
 Croyne, 349.
 Cuffe, 123.
 Cullom, 172, 334, 340, 341, 372, 397.
 Curragh family, 157.
 Cusack, 277.
 Cusshyn, 350, 364.
 D'Ammartin, 353.
 Darcy, 166, 173.
 Dawges, 319.
 De Braosa, &c.: see Braosa, &c.
 Deisi Tribe, Int., 197.
 Delahoyd, 202, 215.
 Desmond, Earls, 1, 23, 24, 104, 173, 196, 202, 204, 207, 209, 210, 212, 215, 228, 233, 236, 291, 310, 313, 314, and frequently after. Gerald and his rebellion, 28, 99, 122, 145, 159, 183, 185, 204. Papers of, 205, 206, 208, 235, 291, and often after; also 332, 360, 369, 374, 377, 392, 395. James, the Sugaun Earl, 166, 205, 210, 277, 281, 291, 319, 359, 389.
 Drew, 299, 328.
 Drury, 141, 144, 154, 308, 374.
 Dondon, 143; family, 185, 229.
 Dondonnell, 184, 309, 372, 376.
 Dowd: see O'Dowd.
 Dowdall, 144, 166, 183, 308, 309, 313, 318, 330, 332, 341, 342.
 Dowglass, 112.
 Downing, 70.
 Dullard, 200.
 Dunboyne, Lords, 89.
 Dunraven, Lords, 166: see Quin.
 Edmondson, 75.
 Eleteragh: see Finnitter.
 Enfaunt: see Young.
 England, Englys, Anglys, Yngles, 122, 130, 296, and p. 72n.
 Encorrig, Fitz Gibbon, 309, 344.
 Escott, 683.
 Evans, 82, 169, 170, 176; family, 188.
 Fanning, 10, 154; family, 167, 202, 203, 215, 296.
 Fant, 257.
 Falltach: see Wall.
 Farrel, Farrelly: see Frawley.
 Fareman, 207.
 Feleteragh: see Finnitter.
 Fenton, 281.

- Field, 41, 122.
 Filkins, 6.
 Finnitter, 334.
 Fisher, 100 (also p. 108).
 Fitton, 52, 103, 104, 121, 124, 193,
 207, 214, 215, 222, 223, 226, 230,
 232, 233, 234, 235, 255, 278.
 Fitz Gerald, 100, 139, 145, 147, 149,
 154, 156, 159, 163, 165, 166, 168,
 173, 176, 185, 194, 207, 215, 231,
 234, 265, 268, 297, 298, 299, 307,
 310, 333, 334, 350, 353. Cork, 357,
 369, 370, 374, 375, 392, 394. See
 also Desmond and Glin. Thomas an
 Appagh, 389, 371, 372, 374. Thomas
 Caune, 310, 370, 371.
 Fitz Gibbon, 253, 272. Also MacGib-
 bon, Encorrig, and White Knight.
 Fitz Harris, 265, 266, 270.
 Flemyn, Vlemeng, Flandrens, &c.,
 176, 300, 304, 356, 390.
 Ford, 24.
 Fox, Boskagh, &c., 40, 139, 167 n, 187,
 188, 190, 191, 202, 219-221, 237,
 245; family, 255, 282.
 Franks, Fraunceys, &c., 344 n.
 Frawley, Farelly, &c., 72, 363.
 Friend, 41, 62, 67, 69.
 Fullerton, 344, 345, 366.
- Galwey, 1; family, 8, 120.
 Gibbins, 335.
 Gibbon: see Fitz Gibbon.
 Gilbert, 145.
 Gill and Gyll, 392.
 Glin, Knight of, 141, 143, 144, 148,
 151, 154-156, 161, 165, 186, 308,
 322, 374.
 Godolphin, 304.
 Gould, 49, 122, 200, 340, 341, 384.
 Goulys, 191.
 Grace, 270.
 Gray, 215, 235.
 Grandison, 87.
 Graves, 342.
 Greene, 56.
 Grey, 106, 210.
 Griffin, 380.
 Grymban or Grym, 347.
 Groome, 210.
- Gubbins, 187.
 Guher or Goer, 185, 382.
 Gunning and Ui Chonaing, Int., 1
 (p. 57), Int., 24, Int., 106.
- Haly, 36, 214, 260, 347.
 Hallie, 117.
 Hampton, 185, 335.
 Hannan, 51, 101.
 Harding, 89, 90, 340.
 Hareng or Scadaun, 274.
 Harold, 76, 234, 309.
 Harrison, 99.
 Harte, 173.
 Hartstonge, 186; family, 186 n.
 Haward: see Howard.
 Helsham, 277.
 Herbert, Harbert, Hubert, &c., 309;
 family, 313-317, 322 n., 326, 387,
 394, 395.
 Henry, 89, 90.
 Hewson, family, 296.
 Hickie, 177.
 Higgins, 210.
 Holcroft, 33, 37, 38, 42, 56, 58, 75, 111.
 Holmes, 2, 376.
 Hourigan, Wrgan, Horegna, 326, 329.
 Howard, 185, 214, 222, 223, 226.
 Hubert or Hubbert, 360, 364: see also
 Herbert and Howard.
 Hungerford, 371-373.
 Hunt, family, 157, 185, 328.
 Hurley, 44, 98-100, 204, 218, 235, 253,
 271, 311, 344.
 Hynes, O'Heyne, &c., 50, 52, 53.
 Hynterberg: see Interberg.
- Ievers, 180.
 Inchiquin, Lords, 196, 332.
 Ingoldesbye, 49, 52, 55, 57, 144, 200, 204.
 Ingram, 65, 132, 139, 140.
 Interberg, 24, 76, 101.
- Jackson, 346.
 Jephson, 169, 196, 206, 373, 381.
 Jeune, Joefne, &c.: see Young.
- Keaghan, 297.
 Kearney, 259.
 Keating, 124.
 Keough: M'Keough, 30; Int., 80.

- Kildare, Earls, 112, 159, 166, 173, 176,
 180, 188, 195, 257.
 Kirle, 68.
 King, 106, 197.
 Kingston, Lord, 201, 230, 233, 354.
 Kyvernoc, 304.
- Lacy, 10, 119, 166, 173, 175, 186, 192,
 207, 210, 234, 256, 299, 301, 305,
 309, 323, 332, 335, 340, 341, 343,
 345, 354, 368.
 Lahiff, 88.
 Lambert, 296, 328, 390.
 Lamplo, 317.
 Landers, Londres, London, &c., 10, 87,
 141, 207, 235, 303, 326 n., 364, 374,
 392.
 Langan, 268.
 Langford, 392.
 Lee, 180, 304, 341.
 Lees, Lesse, &c., 173, 185, 191, 289,
 300, 335, 347, 353, 354, 397.
 Leo, 168, 172, 173, 176, 179.
 Lewis, 246.
 Lexington, 319.
 Lezignan, 215.
 Lillis, 4, 66, 169, 170, 301.
 Liston, 341.
 Lloyd, 86, 354.
 Londres: see Landers.
 Long, 88.
 Lowell, 397.
 Lovelynych, 322.
 Lysaght, 46, 201.
 Lysnekyll, 197.
- Mac Brien, 86, 88-93, 96, 361.
 Macassa, Makisse, 360, 363.
 Mac Canny, 10, 42, 136, 313.
 Mac Clancy: see Clancy.
 Mac Enery, M'Kynery, &c., 183, 332;
 family, 353, Int., 1.
 Mac Gibbon, 161, 262, 281, 368.
 Mac Grath, 103, 105, 277, 335 n.
 Mac Gynouse, 215.
 Machery, 299 n.
 Mac Hewe, 352.
 Mac Hoy, 309 n.
 Mac Ibrien Arra, 86, 105.
 Mac Mahon: see O'Brien.
- Mac Namara, 1, 322 n.
 Mac Rudderaye: see Glin.
 Mac Shehie: see Sheehy.
 Mainwaring, 136, 172, 198, 202.
 Maolrian: see Ryan.
 Mareys, 1, 10, 87, 123, 166, 215, 225, 368.
 Marshall, 74, 232.
 Martin, 293
 Martini, tribe, Int., 197.
 Mason, 335.
 Massy, Lord, 295; family, 110, 217,
 256, 279, 280, 295.
 Maunsell, 68, 75, 141, 143, 175;
 family, 293, 390.
 Mautravers, 291, 313, 376.
 Meade, 356.
 Meehan: see O'Meehan.
 Metcalf, 188.
 Miagh, 238, 240, 243, 310, 347, 356.
 Middleton: see Broderick.
 Minetur, 297, 334, and Minur, 87.
 Molyneux, 27.
 Moncton, 337.
 Moore, 278, 279.
 Morrice, 199.
 Morgan, 208, 255, 390, 395.
 Morton, 308.
 Motying, 304.
 Mulconry, 24.
 Mulholland, Int., 332.
 Mulrian: see Ryan.
 Musegros, 1.
 Muskerry, 370.
 Mutteley, 207.
- Naas, Nash, &c., 190, 235, 292, 294,
 300, 304, 338.
 Newenham, 140.
 Nihell, 120.
 Noonan O'Hynoonman, &c., 351, 359.
 Nugent, 218.
- O'Baithin: see O'Meehan.
 O'Brien, 1, 8, 24, 32, 58, 61, 69, 76, 86;
 of Coonagh, Int., 87, 88, 90-2; of
 Pubblebrian, 106, 107, 113, 114,
 116-118, 120-124, 127-130, 134-
 140; others, 160, 205, 278, 279, 281,
 290, 353, 354, 371, 372, 384, 394:
 see also MacBrien.

- O'Cahell : see Cahell.
 O'Cathalan, Int., 80.
 O'Carthany, 123.
 O'Coggan, 123.
 O'Conor, 24, 71, 173, 319.
 O'Crynan, 123.
 O'Daly, 72.
 Odell, 335, 336, 339, 340, 343, 350.
 O'Donegan, 360.
 O'Donovan, Int., 166, 354.
 Odowan, 123.
 O'Dowd, 380.
 O'Gealwayn, O'Galvan, 123.
 O'Grady, 130, 202, 215-217, 228-230, 233.
 O'Gunning or Ui Chonaing, Int., 106, 123.
 O'Hallinan, 319, 372.
 O'Haskeran, 335 n.
 O'Hea, 66.
 O'Heyne : see Hynes.
 O'Hybyle, 123.
 O'Hynownane : see Noonan.
 O'Kee, 101.
 Oliver, 265 ; family, 268, 272.
 Olybane, tribe land, Int., 291.
 O'Mayll, 123, 128.
 O'Meehan, Obaithin, &c., Int., 374.
 O'Muleashell, 123.
 O'Mulrian : see Ryan.
 O'Nea, 378.
 O'Quillen, 352.
 O'Rahelly, 234.
 O'Regan, 824 n.
 O'Riordan : see Riordan.
 Ormsby, 169, 176, 179, 187, 190, 192, 193, 204, 235.
 Ormond, Lords, 74, 277.
 Orrery, Lords, 2, 86, 190, 291.
 O'Synnene, 297.
 Oughtred : see Ughtred.
- Palmes, 380.
 Parsons, 10, 59, 122, 125, 163, 183, 204, 323.
 Peacock, 130, 139, 296 n., 316.
 Peirce, 215.
 Penryns, 191, 341, 354, 376.
 Peppard, 342.
 Perry family, 173.
- Phitton : see Fitton.
 Piggott, family, 174, 309, 329, 330, 322.
 Plunkett, 144.
 Pollard, 89.
 Ponsonby, 257.
 Powell, 80, 232.
 Power or Poer, 265, 351, 358.
 Prendergast, 189, 368.
 Pubblemynterquyllan, Int., 332, 352.
 Purcell, 157 ; family, 160, 161, 171, 265, 291, 307 ; Croagh, family, 322, 325, 332, 369, 394.
- Quillen : see Pubblemuinterquyllen.
 Quin, 167.
- Ragge, 337.
 Rainsford, 9.
 Raleigh, &c., 210, 223 ; family, 230.
 Reidy, Ride, &c., 157, 200.
 Reily, 340, 341.
 Reymond, 208.
 Rice, 103.
 Ridiford, 233.
 Riordan, 59, 174, 180, 335 n.
 Roche, Rupe, &c., 33, 44, 45, 74, 107, 123, 127, 142 ; of Caherass, 176, 204 n., 270, 277-8.
 Rochford, Rupefort, 44, 123, 297, 308, 329, 335.
 Roileston, 137.
 Rourke, Pubblemuinterrouke, &c., 309, 309 n., 319, 321.
 Russell, 160, 191.
 Ryan, Mulrian, &c., 72 ; Int., 80, 82, 83.
 Ryves, 274.
- St. Leger, 166, 170, 172, 234.
 Saleys, 335.
 Salfield, 353.
 Sandyr the harper, 250 n.
 Sarsfield, 103 ; family, 324, 328.
 Scoler, 125.
 Serle, 119.
 Sexton, 4, 60, 111, 112, 127, 173 n.
 Shehie, 272, 309, 310, 319, 321, 322.
 348-9, 362-3, 365-7, 388 ; Int., 236,
 Sheehan, 205.
 Sherlock, 174, 277.
 Shippley, 371.
 Slingsby, 302.

- Smyth, 44, 195, 313.
 Southwell, 174 n., 308; family, 314,
 316, 332, 340, 361.
 Speirin, 329.
 Stackpole, 41, 141.
 Standish, family, 186.
 Stands, 344.
 Stannard, 258 n., 354.
 Stephenson, 106, 114, 121, 134, 308, 309,
 311, 331-2, 380, 389, 391, 395.
 Stritche, 7, 41, 125; family, 204, 208,
 Stroude, 141, 324, 351.
 Supple, 189, 342, 362, 398.
 "Sugan Earl": see Desmond.
 Sweenie, Int., 236.

 Talbot, 244.
 Tamnaige tribe, 368.
 Tankard, 363.
 Taylor, 145, 147, 149; of Askeaton,
 291, 295.
 Thomond Earls, 19, 104, 122, 136, 198,
 202, 203, 374.
 Thornton, 175, 323.
 Thursteyn, 173, 175.
 Trenchard, 301, 311, 377, 378; family,
 380, 387, 392.
 Troy, 30.
 Twigge, 39.

 Ufford, 87, Int., 24.
 Ughtred, 307, 350, 353, 361, 363, 366,
 368, 369: see also Courtenay.
 Ui: see also O.
 Ui baithin: see Omeehan.
 Uibhrosa, Int., 141.
 Ui bilraidhe, Int., 332.
 Ui Cairbre, Int., 166.
 Ui Cathalain, Int., 80.
 Ui Cuanach, Int., 87.
 Ui Chonail, 387, Int., 291 n.
 Ui Fidgeinte, 215, 353 n., 387.
 Ui Hifferman, Int., 80n.
 Ulster, Earls of, 53, 119.
 Underwood, 390.
 Upton, 136.

 Valence, 166; Valoynes, 185, 291.
 Valle: see Wall.
 Valley: see Glin.
 Vaughan, 395.

 Verdon, 166, 198.
 Villiers, 197.
 Vincent, 34, 299 n.
 Vlemeng: see Flemyng.
 Vyneter: see Finneter.

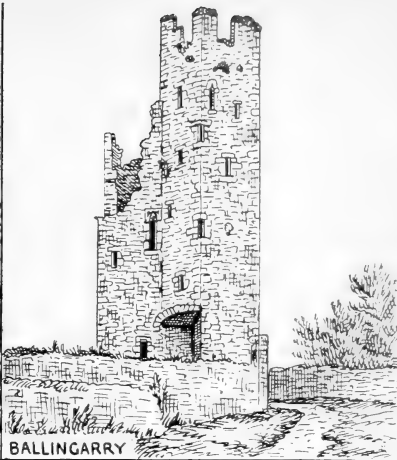
 Wakeman, 382, 384.
 Walcott, 1, 28; family, 322, 329, 371.
 Wall, 247, 311, 316, 330, 331; family, 389.
 Waller family, 141, 144, 155, 159, 164,
 324.
 Wallop, 167, 169, 334.
 Waley: see Glin.
 Walsh, Welsh, de Waleis, 80, 83, 120.
 Wandesford, 296 n.
 Wansell, 369.
 Ware, 141.
 Ward, 335, 398.
 Waspayl, 307, 313, 376.
 Weekes, 210.
 Welle, 215, 291, 353.
 Welsh: see Walsh.
 Weston, 305.
 Westropp, 24; family, 134, 143, 165,
 322, 376.
 White, 20, 55, 69, 91, 94; family, 103,
 123, 184, 208, 376, 397.
 "White Knight," 193, 253, 254, 265,
 267, 281, 293; family, 369, 397.
 Whitfot, 235.
 Whitlo, 387.
 Whitro, 32.
 Whittaker, 342.
 Widenham, 157, 162, 374.
 Wilson, family, 61 n., 78.
 Winckworth, 41.
 Wingfield, 382, 384.
 Wogan, 1.
 Wolfe, 235, 321.
 Wray, family, 183, 205.
 Wyndelbalde, 30.
 Wypeyns, 87.

 Yngles: see English.
 York, Duke of, 29, 33, 34, 42, 56, 65,
 91, 96, 106 n., 134, 140, 143, 145,
 147, 149, 155, 157, 159, 311.
 Young, Lenfaunt, &c., 235, 249 n., 257,
 259, 304.

 Zouche, 166.



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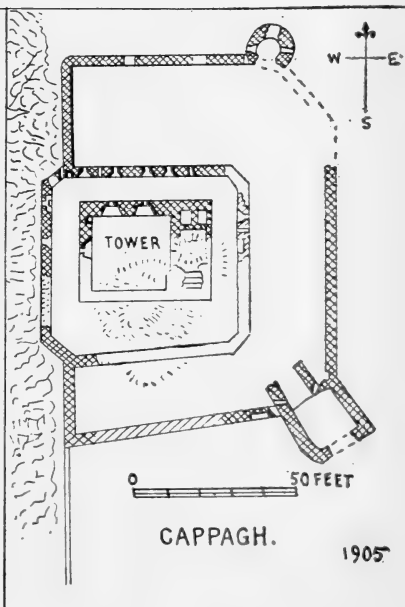
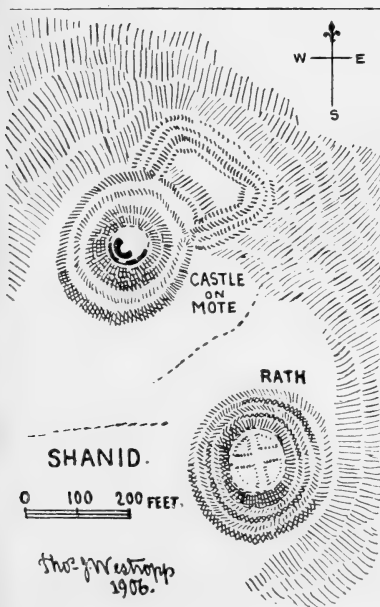
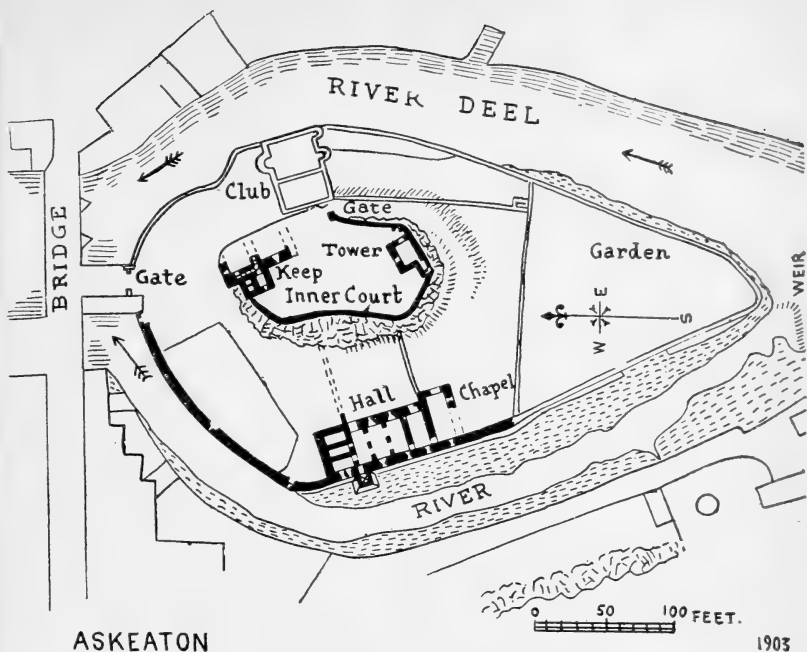
CLONSHIRE



ASKEATON

THOMAS WESTROPP

1906



WESTROPP—CASTLES OF CO. LIMRICK.



XI.

NOTES ON GIG-MILLS AND DRYING KILNS NEAR
BALLYHAUNIS, COUNTY MAYO.

BY HUBERT T. KNOX.

PLATES XIX., XX.

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MR. O'REILLY's article on "Ancient Water Mills" in the Proceedings of the Royal Irish Academy, vol. xxiv., Section c., p. 55, treats of the horizontal water-wheel as no longer in use in Ireland. In the "Social History of Ancient Ireland," vol. ii., p. 339, Dr. Joyce writes that they were in full work all over Connaught fifty or sixty years ago, and that in Connaught people called them 'gig-mills' when speaking English. A few survive around Ballyhaunis, and probably also in other regions. As the tendency is to convert them into vertical wheel mills, and as they are likely to be extinct soon, I have here put together information which has been given me from County Mayo.

The origin of the name 'gig-mill' is obscure. One man says it is from the English 'whirligig.' Brian Kerins, of Cullentra, says he never heard the term 'gig-mill' until he was grown up. The local names in Gaelic give no help. It may be the Gaelic *Geug*, 'a branch,' pronounced *Geeog* in Munster, which would easily become 'gig,' and well describes the ladles branching from the shaft.

Such mills abounded in this region. Most of the existing small vertical wheel mills are known to have been gig-mills. A disused gig-mill at Kilvine has a shaft $3\frac{1}{2}$ feet long.

WILLIAM FLATLEY'S MILL.

It is on the northern shore of the western end of Cullentra Lough. The mill is about 20 feet long, by 10 feet wide. The water tunnel, about 6 feet wide, is at the east end of the mill, which lies east and

west across the stream. The wheel is modern, but on the old principle. The ladles used to be made of sallywood, and chambered as in Gannon's mill; but the present owner finds it more convenient to make ladles of inch boards, like long narrow boxes, but having no side boards towards the water. The bottoms are horizontal, and the outer end pieces are at right angles to the side pieces. They increase slightly in width towards the outer ends, where they are about 4 inches wide. A thin iron hoop goes round the outer ends, giving the appearance of a wheel. There are no iron stays as in Gannon's mill. The ladles are thirteen in number.

The water is collected in a coffin-like cistern with the narrow end pointing towards the wheel, from which the water is let down a chute having an incline of 30 or 40 degrees from the vertical, which is $1\frac{1}{2}$ feet wide at the top and 1 foot at the bottom, and has a vertical fall of about $1\frac{1}{2}$ feet.

The water aperture to this chute is $1\frac{1}{2}$ feet square. A head of about 5 feet above the level of the chute can be obtained.

The use of a chute is an error, as some of the ladles are beaten downwards; to counteract this the outer ring is affixed—a late and ineffective innovation. Gannon's mill utilizes the velocity of the water horizontally; and the water acts practically as a projectile, hardly pressing downwards at all. The $1\frac{1}{2}$ feet wasted by the chute should be utilized as head. The error of the slanting water discharge is apparent on seeing Flatley's mill working, because only a little of the water goes partly round with the wheel. The greater part rushes across it in a nearly straight line, or gets between the ladles to the ground, and does little or no work. The chute system is an innovation here. Flatley's grandfather died while his father was very young, and during the youth of the latter there was a good deal of meddling with the mill by persons not conversant with traditional milling.

The water is admitted across half of the wheel. The ladles are sooner empty at the other side in Flatley's mill than in Gannon's.

The wheel-shaft, $4\frac{1}{2}$ feet long, goes up through a loft, penetrates the lower stone, and articulates into the grinding face of the upper stone by a 'crusheerin,' or cross of iron. The ancient stones in Coolnaha and near Doonooir had a 'crusheerin' of only two arms.

The diameter of the stones is 4 feet 4 inches. They are in the north-east corner of the mill. When working, a circular fence of boards composed of two parts, called 'funsee,' is placed on the floor to the south, to prevent the meal from flying off centrifugally. The walls do this duty to the north and east. To the west, abutting on the stones,

is an oblong compartment, 6 feet by 5 feet, called 'Lèn' (pronounced 'Lyane,' *y* obscure), fenced off from the floor by flags standing on edge, save a portion on the outside and on the length of the floor west and east, where a small low wall takes the place of the flags.¹ The meal flies into it, and has only to be combed up occasionally. The meal which flies out centrifugally in the spaces between the stones and the walls and the funsee is carried gradually round by the air-current generated by the upper stone, until it is whirled through the gap into the lèn.

The hulls of oats have to be removed after drying. For this purpose the stones are set the length of a grain apart. The theory is that the grains go down between the stones on their ends. This seems to be due to observation of the fact that grains of oats fall butt-end foremost. The hulls are separated by an ordinary winnowing machine, and are a perquisite of the miller, who takes one-twentieth, formerly one-twenty-first, part of the cast as his fee, called 'dlighe' (toll).

Over the stones is a rough wooden frame supporting the 'crannoge' or hopper—a four-sided, truncated, inverted, hollow pyramid, 2 feet by 2 feet at the mouth, 6 inches by 6 inches at the lower opening. Under it is an oblong trough, about 15 inches long and 8 inches wide without a fore-end board, called the 'ommereen.' It is loosely attached behind, and its fore end is over the central hole of the upper stone.

The crannoge delivers into the middle of the ommerceen. To the front of the latter, over the hole in the stone, a 'cord' is attached, which is coiled over the framework overhead, and has a small weight attached to the free end, so that by the simplest contrivance the delivery end can be raised or lowered, decreasing or increasing the flow of corn to the stones. Beside the ommerceen a flat stick called the 'rocker,' about a foot long, dangles from the framework, and its lower end touches frequently the revolving stone, thus communicating a tremor to the ommerceen which shakes the corn into the stone.

This is the third Flatley at Cullentra; but in either the male or female line the family has been there for ages, because when the male line ran out a 'Cleenishteach' came in and married the female representative. A mile off, at the east end of the lake, are many traces of ancient communities, and on a ridge a mile north are Liscat,

¹ See Diagram III.

Lisanaffrin, Lis-wheel-wirra ('Lis of Mary's Feast'), and a fine fort, like a truncated mote, called *dhine*, i.e., *daingean*.

PATRICK GANNON'S MILL.

This mill, in the townland of Meeltrane Denis, in the parish of Kiltullagh, has been worked by seven generations of Gannons. It is practically the same as Flatley's. The fourteen ladles are independent spokes from the vertical shaft, inserted close together, so that there are but small interstices to waste water. The diameter of the wheel is $5\frac{1}{2}$ feet. The ladles are made of round logs flattened above and at the front for hollowing, but left natural at the back and below, and about a foot wide. Iron stays, shown in Plate XIX., fig. 3, help to keep them in position. It was an ordinary incident with orthodox ladles for one to fly out and float down the stream.

The tunnel under the mill is about 4 feet high, and 6 feet wide. A beam runs along the centre of the tunnel floor, towards the lower part of the wheel-shaft, which works on this beam by an iron pin revolving on a steel plate fixed on the beam. The shaft is 9 feet long, and $1\frac{1}{2}$ feet in diameter. From this beam rises the post by which the beam is raised and lowered to set the stones.¹

The whole weight on the pivot of this wheel can hardly be 3 cwt. Hence its efficiency. Though the mill stops frequently in dry seasons to gather water, yet it works quickly on account of the rapid revolution of the stone. The grinding speed of both these mills is about 150 to 180 revolutions a minute. The wheel seems to turn at lightning speed, and the water to pursue it in a leaping torrent for more than half way round, when it is neatly dropped. The outer ends of the ladles are slightly recurved so as to check the centrifugal rush of the water and gain power. The water leaps up so much that one can hardly see the shaft; and one sees only a glimpse of the ladles to the left, when they are empty.

The water aperture is 9 inches high, by 7 inches wide. The mill does not work well when the height of the water is less than a foot above the aperture. The supply arrangement differs from Flatley's in that the water is delivered directly to the wheel, from the lowest part of the cistern, by an opening at the level of the upper surfaces of the ladles.

The grinding arrangements are the same as Flatley's, except that

¹ See Diagrams I., II.

the shaft, at places under the stones, is made to give motion to a sieve for grading the meal, and to a winnowing machine for separating hulls of oats after the preliminary crushing.

Flatley uses an old smoothing-iron as a socket for the gudgeon of his shaft. After a few drives of a punch the gudgeon is left to work its way. Millers used to prize the thick pennies of old times for placing under the gudgeon. The smoothing-iron is a modern make-shift for the stone socket of old days.

These mills do not make a uniform size of meal, as the stones are generally not accurately distanced. For grinding meal the bridge is set at the point at which it is most level.

On a review of Mr. O'Reilly's article two points come out:— (1) The mills of Faroe Islands, the Shetlands, and the Hebrides had wheels with boards set obliquely; those of Ireland, the Isle of Man, and Greece had ladles. That of Camillos differed from both, but was more like the ladle wheels. (2) The water was delivered diagonally or from above in the cases in which the direction is expressed, except in the case of the mill described on p. 73, where it was delivered horizontally.

The falling chute therefore is not a new thing. This delivery from above seems better suited to the oblique boards, and the horizontal delivery as near as possible to the wheel seems better suited to the ladles.

The action of the marine turbine steam-engine seems to be in principle that of Gannon's mill, which directs the water on to the blades of the turbine once only to the best advantage. The steam-engine, by means of an outer cylinder fitted with blades, directs it again and again on to blades on the shaft.

Stone sockets are not remembered as sockets for gig-mill water-wheels. They were probably discarded as soon as good iron could be got. The revolution of the water-wheel is not steady enough. The slightest "jig" cracks them. Otherwise they last for ages.

The ordinary foundry smoothing-iron will not do. The gudgeon will bore it at once. Only a tinker's smoothing-iron will do—that is, one cast by our travelling tinkers—a tribe of gipsies.

The sockets examined by me were used to support the spindles of the stones of breast wheel mills. One was given by Morgan O'Brien of Curraun. It was in use for nearly forty years, and was discarded twenty years ago. Another socket from a mill at Lispatrick was in service until twenty years ago, when it was

replaced by iron. A third socket from a mill at Brickeens, now disused, given by M. Costello, is a symmetrically cut stone, nearly a cube. Two grooves are cut round it; and it has, at four corners of lower surface, slight bosses, like rudimentary feet. The first two have been slightly chipped.

The millers say that a good stone is better than any other socket for a pivot, but for its liability to heat and crack. It must be carefully attended to with lubricant, for which tallow is used. M. O'Brien says that a stone socket will not wear one-sixtieth inch in five years.

The iron gudgeon or pivot must be turned in a lathe to form a slender truncated cone; if not, it will bore, and the stone will not last. The upper gudgeon—for the upper stone is penetrated too—must be similarly turned. It works in a bearing in a beam overhead.

DRYING KILNS.

Up to fifty or sixty years ago every townland in this region had a single kiln, and every mill had a double kiln. Each kiln was like a huge tobacco pipe, and was generally built on a slope so that only about 2 feet of the walls protruded above ground-level. The 'Poorheen'¹ was a tunnel through the side of the bank. The fire was placed at its mouth.

Three 'leumwee' supported the 'sporrooghee.' Sheaves of straw were laid heads inward over the sperrooghee. These sheaves were of scutched straw. Scutching is done by taking the sheaf in both hands by the butt, and striking it against a block, as a preliminary to threshing with a flail. The straw is thus in regular order for the 'sgriv.' Very little corn goes through.

A little door was in the sloping beehive roof of the kiln on the inner side over the 'poorheen.' The door was of wattle covered with straw like the roof, having straw or hay ropes for hinges, and was made to lie flat on the roof. If wind blew on it, the door was covered with a sack to prevent draught from entering. There was no opening to let out smoke, which filtered through the roof.

Very little smoke is created in these kilns. The hot gases which pass through the corn produce a culinary effect and improve its flavour. People in the habit of using meal so treated think other meal insipid. Stirabout and fresh oat-bread made from meal under the old system are delicious.

Drying took about twenty-four hours. In the new kilns it

¹ For this and other words see Glossary at end.

takes an hour for every hundredweight of corn. The corn must be turned frequently. The old kiln conserved heat and economised fuel; but the new kiln does more work.

This new type of kiln came into use about fifty-five years ago. Rough plans are given of those now used by Flatley and Gannon.

Another kiln, which had been dismantled, was in the extension of the house to the left, with a space between the two kilns like the hall of a house.

Gannon has a double kiln a little larger, arranged a little differently. It has two leumwee of stone, each fourteen feet long, made of flag sandstone of Slieve Dart. The Gannons make their own millstones.

The poorheen, seven feet long, ends in a round, perforated structure capped by a round flag three feet in diameter.

The old kiln is made of the commonest material in such a way that the miller and his family can do the whole work themselves. The new kiln is in principle the same, but is larger, more expensive, more permanent, and capable of doing more work.

The owner of the cast dries the corn himself and supplies the turf. In the time of the old kilns, the corn was sometimes dried at the townland kiln.

In this country up to sixty or seventy years ago, the first few sheaves of oats cut by the reapers used to be scutched and winnowed, and the corn put in a pot over the fire, and dried. It was then ground in a quern, and stirabout made from it for the breakfast of the reapers and the family. The same was done in the case of any other meal at which stirabout was used during reaping time. This shows the speed with which food could be dressed by means of a quern.

'PRÁPÍN.' In Munster up to forty years ago, and perhaps yet in remote parts of the province, the gleaning of the wheat crop was made into stuff called 'prápín.' The grain was shed by rustling the ears in the hands. The husks were removed by blowing, or by the wind. The wheat was then put in a pot, or on a griddle, and dried over a fire. When dried it was ground in a quern, mixed with new milk or cream, and eaten without more ado. 'Praupeen' was a great favourite with children, and was their standard of comparison. Any nice cereal food was said to be nearly as nice as praupeen.

To prepare food with a quern is easier than most people imagine, and the system is marvellously economical, besides getting the best out of cereals. Everyone knows the difference between freshly-ground and old-ground coffee.

GLOSSARY OF LOCAL MILLING TERMS.

- Ammapin, . . . a little trough.
 Ait, . . . a kiln.
 Upo, . . . a millstone.
 Clabairé, . . . babler. The stone fixed to the rocker.
 Comla, . . . sluice or floodgate.
 Crannog, . . . hopper.
 Croir iarain, . . . cross of iron. Pin with branched top which connects the shaft with the upper stone.
 Cuið, . . . a small hollow truncated cone of wood on the crusherin pin to prevent the corn from falling down the aperture in the lower stone.
 Droidead, . . . bridge. The horizontal beam which carries the weight of the water-wheel, &c., and is raised or lowered at one end by the shole. The mweela is sunk in the bridge. Also the beam which supports the spindle in a vertical wheel mill.
 Fearraib, . . . spindle. The bottom iron or gudgeon of the mol or shaft, revolving on the mweela. Pronounced farsudh.
 Fonra, }
 pl. Fonraíde, } hoop, hoops.
 *Léun or Léin, . . . (Pronounced lyane, *y* obscure.) The enclosure into which the meal is thrown by the stones.
 *Liamán, pl. Liam- }
 aí or Liamáide, } the rafter of a kiln.
 Lián, . . . the ladle of a horizontal wheel. O'Reilly gives Liað, a ladle. Liaðán?
 *Maola, . . . pronounced mweela. The iron or stone socket sunk in the bridge, on which the farsudh revolves.
 Mol, . . . mill-shaft.
 Muillinn tom le }
 láir, } mill with bottom on the middle. Name for a 'gig-mill.'

- Mullionn toin le } mill with bottom on the ground. Chief name
 talain,) for a 'gig-mill.'
- *Dupéin, flue of a kiln.
- Rocape, rocker of the omereen. Pronounced ruckerra,
 probably the English 'rocker.'
- Salbameað. pronounced sollwunoo. According to Gannon
 the machinery for varying the distance between
 the stones. He translates it 'lever.' Flatley
 says the Gaelic for 'loom' would be the
 proper term. See Seól.
- Seól, loom. According to Flatley and John Scully of
 Aghataharn the vertical rod which penetrates
 the loft from the water tunnel, by which the
 adjusting power is applied to the outer end of
 the *Ópoiceað*.
- Sgiatán, ladle of water-wheel according to Costello. A
 wing, a fan. Means also an umbrella.
- *Sđpib or Sđpiob, The straw in a kiln on which corn is laid.
- *Spapuc One of the short sticks supporting the straw in
 a kiln.

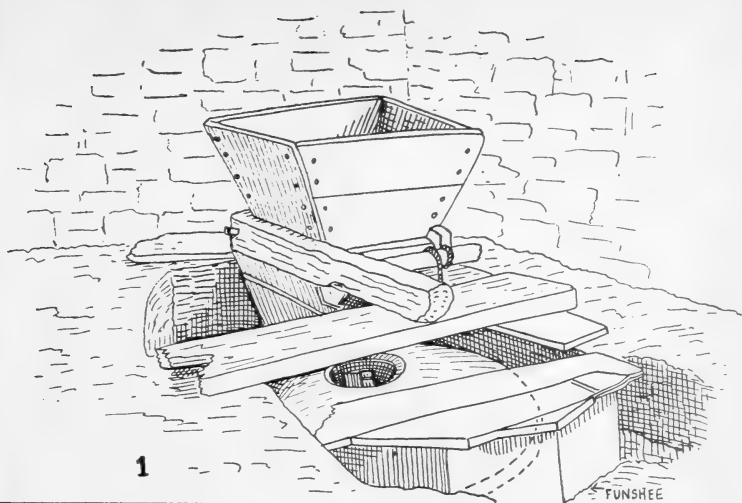
* Asterisk prefixed to cases where spelling is uncertain.

NOTE—No special name for the vertical mill-wheel is used.

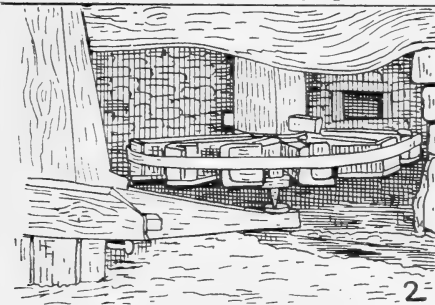
DESCRIPTION OF PLATES.

PLATE XIX. 1. Flatley's Mill, upper works. 2 and 3. Mill wheels. 4. 'Ladle' spoke (usually of sally, willow, or poplar wood). 5. Diagrammatic plan of kilns. 6. Stone sockets for the gudgeon of the mill-shaft to work in. The stone to left is of unknown use; the central hole goes through.

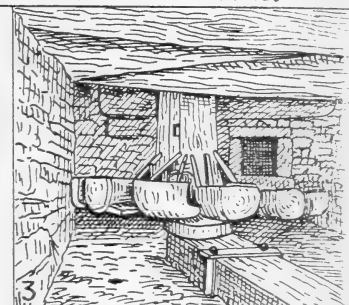
PLATE XX. 1. Flatley's mill, apparatus for raising the shaft and upper millstone. 2. Similar device in Gannon's Mill. 3. Flatley's Mill, plan of upper part. 4. Flatley's kiln. It is raised three feet above floor on thin walls with small opes to let off the heat—(a) stone joists, $10\frac{1}{2}$ feet by 6 inches by 4 inches; (b) 'Leeumwee' of wood; (c) is a rectangular flag over termination of 'poorheen'; (d) ventilator. 5. Gannon's kiln. 6. A section of an old-fashioned kiln. 7. 'Crusherin'; in centre is an iron pin running through the shaft. 8. 'Rocaire' and 'Clabaire'—(a) a small stone was sometimes placed here and showed when anything was wrong by clicking against the shaft; (b) tongue fitting into the aperture of the stone.



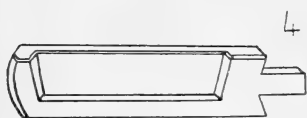
1 FLATLEY'S MILL - UPPER WORKS. OUTLINE OF MILLSTONE DOTTED



2 WHEEL OF FLATLEY'S MILL



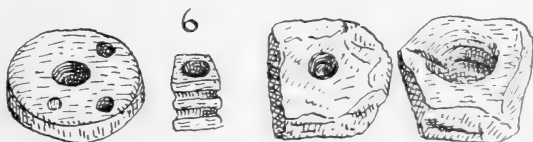
3 WHEEL OF GANNON'S MILL



4 "LADLE" SPOKE OF WHEEL



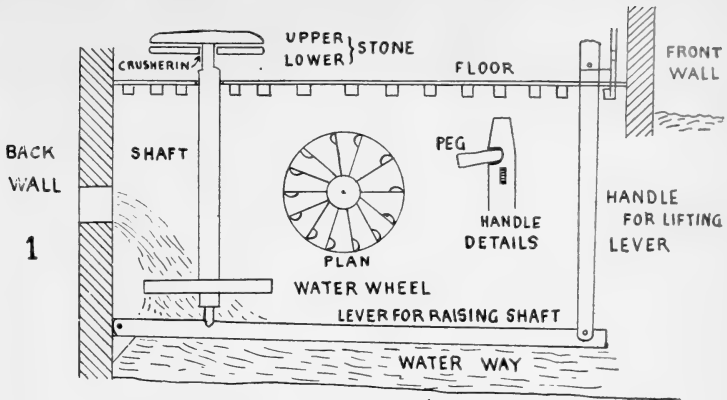
5 KILNS - DIAGRAM.



6 STONE SOCKETS

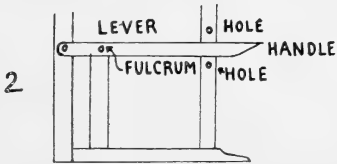
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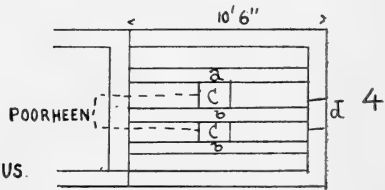


FLATLEY'S MILL.

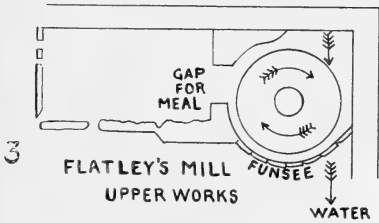
SHAFT



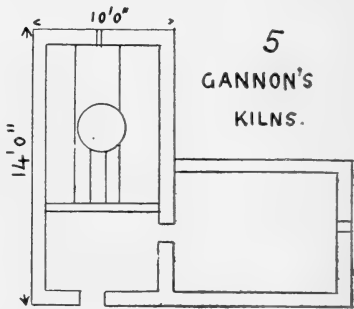
GANNON'S MILL - LIFTING APPARATUS.



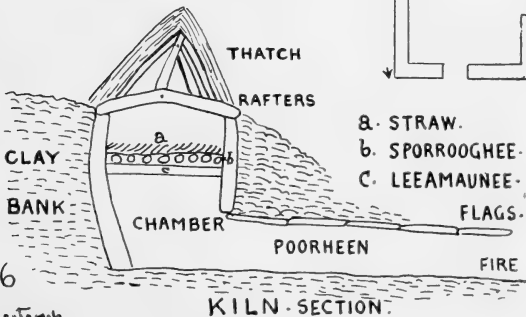
FLATLEY'S KILN



FLATLEY'S MILL UPPER WORKS



GANNON'S KILNS.



KILN - SECTION.

- a. STRAW.
- b. SPORROOGHEE.
- c. LEEAMAUNEE-FLAGS.



CRUSHERIN.



ROCAIRE AND CLABAIRE

1906

J. M. Eastrop



XII.

THE HOSPITAL OF ST. JOHN OF JERUSALEM IN
IRELAND.

By C. LITTON FALKINER, M.A.

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SOME few years since, in discussing before the Academy the origin of the Phoenix Park, I had occasion to refer to the earlier history of the portion of the lands at first comprised in the celebrated enclosure which had formerly been attached to the once famous Priory of Kilmainham. It was not germane to my then purpose to dwell at any length on the story of that ancient and splendid mediaeval establishment which once occupied the site of the Royal Hospital, and which has been described by Ware as "the most noble Priory of St. John of Jerusalem in Ireland." It was enough on that occasion to note the fact, well known to students of local history, but not then generally familiar, that the Phoenix Park had originally included the lands on the south bank of the Liffey, which for two centuries have been appropriated to the Royal Hospital. But the history of Kilmainham in those earlier centuries when it was the headquarters in Ireland of the Knights of St. John, associated as it is with remarkable personages and with interesting events, is not one to be ignored by anyone who cares for historical associations, or feels the attraction that lies in the recovery of lost traditions and in the identification of the scenes of memorable episodes. In the present paper, accordingly, I propose to recount the Irish annals of the Knights Hospitallers, in so far as they can be connected with the seat of the principal house of that order in Ireland. The topics which such an endeavour will naturally embrace are, in the first place, the early associations of the locality in which the Priory stood, and the origin of its occupation by the Order of St. John; in the second, the extent and distribution of the very considerable possessions of the Hospitallers in Ireland,

of which Kilmainham was the administrative centre; and lastly, a consideration of the part played by the Priors of Kilmainham in the history of Ireland and its capital. It will be found, I think, that the rôle sustained by those important personages was not unworthy of the famous Order to which they belonged, that militant brotherhood which, from its institution in the twelfth century to its suppression at the close of the eighteenth, bore so brilliant a part on many a mediaeval battlefield, and exercised through its leading members no mean influence on the evolution of modern Europe.

Of all three branches of the subject much is to be found in works dealing with the ecclesiastical antiquities and local history of the country, more particularly in Archdall's "*Monasticon Hibernicum*"¹ and D'Alton's "*History of the County Dublin.*" But the progress of antiquarian research, and the publication of documentary materials of every sort, formerly accessible only with difficulty to the most industrious student, have so substantially enlarged the sources of information available that not a little can now be added to what was known on the subject thirty or forty years ago. Careful exploration of the State Paper Calendars and other official publications, as well as of some manuscript sources not hitherto utilised, has enabled me to add some facts of interest and importance to the story of Kilmainham, and perhaps to form a clearer conception of what has already been ascertained. For even writers as authoritative as those I have named seem to have entertained some very erroneous impressions regarding Kilmainham and its owners. Of these a striking example is afforded by the mistake which is common to every existing account of the antiquities of Kilmainham, and, I am inclined to think, to every writer who has hitherto treated of the subject, with the exception of the elder Ware. I mean the frequent error, which, by a natural but not quite excusable confusion of one great military Order with another, has ascribed the first ownership of the Priory of Kilmainham to the Knights of the Temple rather than to those of St. John. Even in such works as Archdall's "*Monasticon Hibernicum*," and D'Alton's "*History of the County of Dublin*," the mistake is continually made; and Harris, in his edition of Ware, actually states that it was not until the suppression of the Knights Templars under Edward II that the rival Order was established in Kilmainham. Harris, if no one else, should have known better. For the true origin of the Priory cannot be better or more succinctly stated than in the language of Sir James Ware, who, in his "*Antiquities of Ireland*," tells us that it was "founded for Knights of the

Order of St. John Baptist of Jerusalem, commonly called Knights Hospitallers, by Richard, surnamed Strongbow, Earl of Pembroke, or Strigul, about the year 1174, and Henry II confirmed the endowments. It was afterwards mightily enriched by the donations of others, and especially under Edward II, when the revenues of the Templars, then newly suppressed, were granted to this Order, Walter del Ewe being then Prior of the Hospital.”¹

I trust I shall have the pardon of the Academy for the inevitable incompleteness of a paper which contains the results of a sufficiently recondite inquiry. Yet I hope that I shall at least succeed in indicating some of the sources of interest which combine to render the story of the ancient Hospital of St. John of Jerusalem one of the most useful starting-points which could be selected by any writer for an endeavour to realise something of the aspect of life and affairs in Ireland in the dim period of remote Plantagenet history. No foundation in Ireland not strictly ecclesiastical, whose fabric survived to so late a period as the Priory of Kilmainham (which served for many years after the suppression of the monasteries as the Viceregal residence), has a history which can be traced further back than that of the chief house of the Knights Hospitallers in this country. Nor would it be easy, with the exception of Dublin Castle, to name another site in Ireland which (save for a comparatively brief space in the seventeenth century) has been continuously associated with the administrative history of this island from the coming of Strongbow to the present day. In a country, the circumstances of whose chequered history have left it sadly deficient in those intimate and obvious associations with recorded history which are the pride of other European countries, it is a fortunate chance which enables us to find in the Royal Hospital of Kilmainham a direct link with the stirring story of the past. We are all here familiar with the announcement which *The Dublin Gazette* is wont to contain, in the occasional absence of the Viceroy, of the appointment of Lords Justices for the government of Ireland. Among these, when he happens to be in Dublin, the Commander of the Forces and Master of Kilmainham has hitherto been almost invariably included. The citizen of Dublin who is attracted by such memories will dwell with pleasure on the fact that the twentieth-century Master of the Royal Hospital is the direct successor to the ancient tenants of its site—

¹ Ware's "Antiquities of Ireland," ch. xvi., p. 78 (Edition of 1705).

those warrior monks, the Priors of the Hospital of Kilmainham, into whose hands the sovereigns of mediaeval Ireland not infrequently committed the sword by which they governed.

I.

THE PRIORY OF KILMAINHAM.

The earliest associations of Kilmainham are those which are connected with the seventh-century saint from whom it derives its name. The place, as Ware states, "took its name from S. Maignan, . . . who lived about the beginning of the seventh century." Of this saint not much is known; but Ware's statement as to his date is confirmed by the record in the "Leabhar Breac," that St. Fursa, who is known to have preached through Ireland from 627 to 637, "once happened to visit Maignenn at Kilmaignend." His name occurs in the Martyrology of Aengus at December 18; and the same authority gives his mother's name as "Sinell, daughter of Cennanán, and sister of the old S. Sinchell." Ware calls him a bishop, but Colgan, in his "Acta Sanctorum,"¹ describes his ecclesiastical rank as that of Abbot of Kilmainham, near Dublin; and gives his descent as "Son of Aeth, son of Colgan, of the race of Colla Dachriach." In the Martyrology of Garmán, the saint is, however, styled bishop *and* abbot. "A Life of St. Magnenn of Kilmainham," which has been printed, from an Irish manuscript in the British Museum, in "Silva Gadelica," prefixes to a graphic narrative of the miracles imputed to the saint the following account of his parentage and character: "Magnenn, and Toa, and Libren, and Cobthach, were the four sons of Aeth, son of Colga, son of Tuathal, son of Felim, son of "Colla fó chrích. Which bishop (Magnenn) was from Shannon to *benn Edair* [the Hill of Howth] a tower of piety, and in his own time a vessel of selection and of sanctity: one that from his seven years completed had never uttered a falsehood, and (for fear lest he should see the guardian devil of her) had never looked a woman in the face."² St. Maignenn, as appears from his pedigree, belonged to Uriel, and

¹ Louvain Edition, 1645, p. 584.

² S. H. O'Grady's "Silva Gadelica," p. 35; and see the note at p. 509, where the facts as to St. Maignenn's origin are collected.

it is noticeable that of the nine Kilmainhams which occur in the Townland Index, all but two are within that territory.¹

None of the traditions which have been preserved respecting St. Maignenn have any special relation to the seat of his Abbey, and, except for the mention by the Four Masters under the year 782 of "Learghus Ua Fidechain, a wise man of Cill Maignenn," and (in the Book of Lecan), of Eochaid, Magister of Kilmainham (which seems to indicate that a school existed there), history is practically silent about Kilmainham from its foundation almost to the eve of the Battle of Clontarf.² It has, however, as Professor Kuno Meyer has lately made us aware, a place in the proverbial philosophy of the Irish Triads, where it is bracketed with Derry and Taghmon as among "the three places of Ireland to alight at"; whence we may infer that the Abbey of Kilmainham possessed from the earliest times a reputation for generous hospitality. In the struggle to dislodge the Danes with which the eleventh century opened, the importance of its position, in close proximity to the Scandinavian stronghold in Dublin, made Kilmainham the scene of more than one encounter between the Gaedhill and the Gaill. In 1012, according to the Annalists, "Murchadh, son of Brian, plundered the country as far as Glen-da-locha and Cell Maigneann, burning the whole country, and carrying off innumerable prisoners."³ A little later the chieftain was to find his own grave near the field of his foray. For it was to the ancient cross of Kilmainham that, according to tradition, the bodies both of Murchadh and his son Turlough were brought for burial after the Battle of Clontarf; a tradition which, perhaps, derives some authority from the discovery, at the end of the eighteenth century, of the sword still shown at the Royal Hospital as O'Brien's.

From the triumph of Brian Borumha to the coming of the English,

¹ The variations of this place-name, alike in its Anglicised form of Kilmainham, and in its Gaelic original of Cell-Maignenn, are very numerous. I am indebted to the courtesy of Father Edmund Hogan, S.J., for permission to enumerate the examples he has collected in his notes to the "Onomasticon Góidelicum," under the article on "Cell-Maignenn," viz. :—Cill-Magnenn, Cill-Magnend, Cill-Meinan, Cill-Menin, Kil-Maignan, Kilmaynan, Kilmenan, Kilmenania, and Kylmaynan. Other forms will be found in the Irish State Paper Calendars, where, however, the spelling varies with the whim of the writers.

² Mo-Galbóc of Kilmainham is mentioned in the Book of Leinster, pp. 364, 368; in the Book of Ballymote, 1256; and in the Book of Lecan, p. 109. And there is mention in the Martyrology of Tallaght, under October 26, of "Dairinill, Dairbellin, Cael, and Comgell, virgins in Kilmainham."

³ Annals of the Four Masters, i. 769.

the story of Kilmainham again becomes a blank. But as connected with the Anglo-Norman invaders, it re-opens at the earliest possible moment. The charter by which the Knights of St. John originally derived their title to the lands of Kilmainham has long been lost. But its existence was conclusively established so far back as the year 1261, in a suit heard in the Court of Prince Edward (Edward I) as Lord of Ireland, between the Mayor and Commonalty of Dublin on the one hand, and the Prior and Brethren of the Hospital of St. John of Jerusalem on the other. The citizens having ejected the Hospitallers from a piece of land on the banks of the Liffey, which they claimed under their city charter as part of the liberty of Dublin, the knights were put to the proof of their title. The latter then averred that the Hospital of Kilmainham had been enfeoffed of the disputed lands before the citizens of Dublin had themselves become enfranchised, by a Charter given them by Henry II, which they put in evidence. The jurors found in favour of the Hospital, and they set out in their finding with remarkable precision a complete abstract of the Hospital's title. For they found that Richard Strongbow formerly enfeoffed the Prior and Hospital of Kilmainham of all the land of Kilmainham with its appurtenances; that subsequently Henry II. enfeoffed Hugh Tyrel the Elder of Kylmehanok and its appurtenances, with half the water of the Liffey, "as far as the watercourse near the gibbet"; that Hugh Tyrel¹ in turn enfeoffed the Prior and Hospital, with Kylmehanok² and the fishery rights annexed to it; and, finally, that King Henry confirmed the grants of Strongbow and Tyrel, excepting these grants from those to the citizens of Dublin, which latter the jurors expressly found to have been made subsequent to those in favour of the Knights of St. John.³

¹ Hugh Tyrel had been granted Castle Knock by Hugh de Lacy :

"Castle Knock in the first place he gave to Hugh Tyrel
Whom he loved so much."

See "The Song of Dermot and the Earl," translated and edited by Goddard Orpen, l. 3132, p. 229.

² Kilmehanok is so spelled in most of the authorities. The correct form appears to be Kilmehauok; in Sweetman's Calendar, i., p. 22, it is given as Kilmehafoch.

³ "Que jurata dicit quod predicti maior et communa disseisiverunt predictum priorem, sicut breve dicit, quare dicit quod Ricardus Strangbowe quondam feoffavit priorem et domum de Kylmaynan de tota terra de Kylmaynan cum pertinenciis. Postea venit hic Henricus, rex, avus domini regis nunc, et feoffavit Hugonem Tyrel, seniore, de Kylmehanok cum pertinenciis, cum medietate aque de

Tyrel's gift of Kylmehanok added to the original grant of Strongbow the lands on the north side of the Liffey which immediately face Kilmainham—an area now connected with the latter by Sarah Bridge, more familiarly known as Island Bridge, but in those early days by the fords known originally as the Fords of Kylmehanok and Tyrel's Ford. The place was one already interesting for its historical associations. For here, on Wednesday morning, Sept. 15th, 919, Niall Glun-dub, or Black-knee, marching to capture Dublin, was defeated by the Danes and mortally wounded in the "Battle of Dublin."¹ The ford of Cell-mo-samócc, to give the spot its Irish name,² has long been one of the most important of Dublin landmarks, helping to mark the boundaries of the liberties of Dublin. In the account of the riding of the franchises, in 1488, the record recites how in that year the Mayor of Dublin, and his civic brethren, having

Auenelif, usque ad ductum aque juxta gybbettum. Et postea venit idem Hugo, et feoffavit predictum priorem et domum de Kylmaynan de Kylmehanok, cum omnibus pertinenciis predictis. Et postea venit predictus Henricus, rex, et confirmavit donum predicti Ricardi Strangbowe de Kylmaynan et donum predicti Hugonis Tyrel de Kylmehanok, cum omnibus pertinenciis predictis, unacum feoffamento omnium illorum qui predictum priorem et predictam domum feoffaverunt. Postea venit dominus, rex, nunc et feoffavit civitatem Dublin ad feodifirmam de civitate Dublin, cum aqua de Auenelif et omnibus pertinenciis, exceptis illis qui prius fuerint feoffati. Dicunt etiam quod predictus prior et domus de Kylmaynan longo tempore feoffati fuerunt antequam predicti maior et communa fuissent feoffati."—Dublin White Book, fol. 107. See Gilbert's "Historic and Municipal Documents," p. 495, and "Calendar of Dublin Records," i., 161.

¹ The scene of this battle is wrongly placed by O'Donovan, Haliday, Todd, and other writers, of whom the latest is my friend Mr. Stephen Gwynn, at Kilmashogue Mountain, some seven or eight miles away, a distance which hardly squares with the Four Masters' description of "the battle of Ath-Cliath, that is of Cil-Mosamhog, by the side of Ath-cliaith." For this identification of the site of the battle with Cill-mo-samoc, I am indebted to Father Hogan and his friend Mr. Charles M'Neill. The date of the battle given above is based on the following note from Father Hogan:—"Date of the battle—'Wednesday, the 17th of October, 917. In that year Easter fell on April 25 and Low Sunday fell in summer.'—Four Masters, O'Donovan's Notes. The criteria here indicate the year 919. Dr. M'Carthy (Codex Palatino-Vaticanus, p. 371) says:—'October 17 in 917 was Friday'; the Easter incidence shows that the year was 919; the true reading is given in the Annals of Ulster:—'17th of the Kalends of October; September 15 fell on Wednesday in 919.' Dr. M'Carthy omits the date 919 in the Annals of Ulster Index."

² Mo-sámoc, as I learn from Father Hogan, means 'my sorrel.' Father Hogan also points out that the name Kilmehaug occurs in the Red Book of Ossory as the name of a church in that diocese. See Rev. W. Carrigan's "History of the Diocese of Ossory."

passed by Kilmainham, "ridd northward in and throw the water of Amplyffy to the west end of Elyn Hor hir medue, for that is calld the ford of Kylmahenoke, for the hyll that is now called the hyll of Isold's Fonte of old tyme was called Kylmahenoke hyll." In the yet earlier perambulation of the boundaries of Dublin, in 1326-1327, the Ford is called Kylmehanok, an adjacent ford being called Tirelesford. And again, in the riding of the franchises of 1603, the tradition is still preserved, mention being made of "the hill called Kilmahenock's hill, and nowe the hill of Isold's font, which is a bow-shot of the west side of Isold's font and west of Ellen Hoare's meddowe, over which font is a great hathorne tree."¹

¹ Dublin Records, i., 494, 157, 196.

By the kindness of Father Hogan, to whose learning all students of Irish topography owe a large debt, I am permitted to quote the following note from his as yet unpublished "Onomasticon Góidelicum":—"The Charter of John, Lord of Ireland, of the year 1192, states the metas or boundaries of Dublin:—'in occidentali parte de Dublin ab Ecclesia S. Patricii per vallem [the modern Coombe, cf. Irish and Welsh *Cám*] usque ad Karnanclonogunethe (Carnan Clono Ui Dunchada), now corrupted to Dolphin's Barn, at which is a remarkable heap or mound (Carnan)] et deinde usque ad divisam terrae de Kylemenan, et ultra aquam de Kylmeinan juxta Avenelith (the Liffey) usque ad vada de *Kilmehauoc*, et ultra aquam de Avenelith versus Boream per Ennocnagauhoc.' Gilbert's National MSS. of Ireland, Part II., LXV. In a copy of this Charter, an. 1200, in Sweetman's 'Calendar of State Papers,' p. 22, it is written Cellmohafoch: the citizens of Dublin in 1236 grant to Randulfe Hore a meadow extending from the old quarry of the Oustmans to Kilmehauok: the lands of Kylmanan so far as the water of Avenlyf, thence near that water so far as the ford of Kilmehauoc, and beyond the water of Avenlyf, towards the north by Ennocnegannoc towards Cobragh of Dublin (now Cabragh). Gilbert's 'Ancient Records of Dublin,' i., 81, 157, at p. 190, of which we have the Ryding of the Frauncheses and Liberties of the City of Dublin according to ancient custome perambulated in 1603:—'We passed over the water at Cammok betwixt the arrable land called now the Leis of Kilmayneham, and so directly westward to that parte of the meddowe that lyeth opposite upon that parte of the hill called Kilmahennookes hill and now the hill of Isold's font which is a bow-shot of the west syde of Isold's font and west of Ellen Hoare's meddowe over which font is a great hathorne tree and in that part of the meddowe of Kilmayneham the Maior Swoordbearer and others tooke boate and passed upp the water of Aunlyffe neer Kilmaynehame Bridg wher was said was a foorde called Kilmahenocks foord and then tooke horse and rode eastward over and by north Isold's font and to the font itselfe and then rode to the slade by north-west the west end of Ellen Hore's meddowe and in and throughe that slade northward where was saide of oulde time was a buyse of hathorne and so to the top of the hill,' &c. So Cill-Mosmamoc al. Kilmehanoc (leg. Kilmehauoc), now spanned by Sarah Bridge, a little on the north of which are rudera, which to Ch. M'Neill seem to mark the site of the Cell half-way on a straight line between the Wellington Monument and the Magazine Fort, Phœnix Park."

There is no distinct evidence to connect Strongbow in any especial manner with the Order of the Knights of St. John, though it is on record that his father before him had endowed the Hospitallers with lands in Suffolk. It is probable, however, that the first grant, which the Dublin jury found to have been made prior to Henry the Second's Charter of 1172, was made even before his coming into Ireland. We know from the language of the old French poem, "The Song of Dermot and the Earl," as well as from more dryasdust sources, that subsequent to his agreement with Dermot M'Murrough, and before the actual invasion of Ireland, Strongbow had bought the assistance of several among his confederates by provisional allotments of territory in the scene of his enterprise:—

"To Maurice de Prendergast
The valiant Earl Richard
Had already given Fernegenal,¹
And in his Council confirmed it
Before the renowned Earl
Had landed in Ireland :
Ten fiefs he gave him on this condition
For the service of ten Knights."²

The poem contains no record of a like gift to the Hospitallers. But the Knights Hospitallers of Jerusalem were already famous when Strongbow was organizing his memorable enterprise, and nothing seems more probable than that the leader of the adventurers should have conciliated their powerful support by the grant of a site for a priory near the capital. If the old Monastery of St. Maignenn still survived the havoc wrought by the early Danes, no more appropriate spot could have been assigned to an Order of militant monks than an ecclesiastical establishment which occupied a site of considerable strategic importance. However that may be, it is certain that to Strongbow and his comrade in arms, Tyrel, the Knights of St. John owed the first endowment of their Order in Ireland, and the nucleus of the great possessions which they gradually acquired in this island—possessions which in time became sufficiently extensive and important to give to the Prior of Kilmainham a high place alike in the councils of his Order and in those of the Plantagenet Lords of Ireland.

¹ A territory in Shelmalier East, County Wexford.

² *The Song of Dermot and the Earl*, ll. 3072-79.

II.

THE POSSESSIONS OF THE HOSPITAL.

Our notion of the importance of the Hospital of Kilmainham would be extremely inadequate were we to conceive of its authority as limited to the lands directly annexed to the Priory, extensive though these rapidly became through the grants of successive monarchs, and the bounty of generations of pious donors. The immediate possessions of the Priory (which included a great part of the modern Chapelizod, as well as the mills and weirs of Kilmainham) had probably assumed the aspect which they presented as late as Tudor times even before the assignment of the property of the despoiled Templars, early in the fourteenth century, had powerfully increased the wealth of the Knights of St. John. But besides what they owed to royal liberality, the Priors of Kilmainham were continually receiving accessions of property in the form of gifts of houses and small parcels of land scattered through the City and County of Dublin. The bare recital of these occupies many closely written pages in the Inquisition ordered in the 33rd of Henry VIII, after the dissolution of the monasteries, to ascertain the extent of the possessions of the Priory.¹ That document begins by reciting the immediate belongings of the Priory in the following terms:—

“Inquisition, this Wednesday next after the Feast of Corpus Christi, 33rd Henry VIII, finds that the last prior was seized of the said Priory with all its buildings, and three gardens, and an orchard walled with stone, four towers erected on the said walls; one tower on the north hangs over the bridge crossing the river Lyffe, which gardens and orchard were reserved for the use of the Hospital, 260 acres of arable land, the demesne, annual value £13; 12 acres of meadow, a large wood containing 42 acres on the north of the river, another wood of 10 acres of underwood and 5 of pasture, which were reserved for the use of the Hospital, and 260 acres of pasture and briars.”

The Inquisition goes on to enumerate in a long list of additional possessions a mill on the river Lyffey, a fulling mill on the river Cammoke, a salmon weir with boat and nets on the Liffey, the

¹ The substance of this Inquisition has been printed in D'Alton's "History of the County of Dublin," pp. 624-6.

rectories of Kilmainham, Chapelizod, Ballyfermot, and Palmerston, with the altarages of these parishes, besides scores of lesser endowments. But these valuable appanages of the Priory, though they doubtless served to maintain the prestige of Kilmainham as the wealthiest individual house of the Knights of St. John, formed but a small part of the aggregate opulence of the Order in Ireland. For affiliated to Kilmainham were numerous houses of lesser consequence, but, withal, of considerable importance, which were spread through not less than eight Irish counties, and which represented in every instance the beneficence of Anglo-Norman patrons exercised in the twelfth and thirteenth centuries, and in most cases within a few years of Strongbow's coming. The list of the foundations of the Knights Hospitallers given in Ware's "Antiquities"¹ specifies no fewer than twelve of these, viz.:—

In County Kildare, the Preceptories of Kilbegs, Kilheel, and Tully.

In County Wexford, the Preceptory of St. John and St. Brigid at Wexford, founded by William Mareschall, Earl of Pembroke; and the Preceptory of Ballyheuk.

In County Meath, the Preceptories of Kilmainham-beg and Kilmainham Wood.

In County Down, the Preceptory of St. John Baptist in the Ards, founded by Hugh Lacy.

In County Waterford, the Preceptory of Kilbarry.²

In County Cork, the Preceptory of Mourne.

In County Limerick, the Preceptory of Any.

In County Galway, the Preceptory of Kinelekin.

These were houses numerous enough, with the endowments attached to each, to give the Knights of St. John, even from the earliest moment of their connexion with Ireland, a hold upon the country such as must have enabled them to sustain on at least equal terms with their rivals the Templars the authoritative position which the two great military Orders asserted, almost from the moment of their origin, in every country of mediaeval Europe. But the wealth and consequence of the Hospitallers received an immense extension when, shortly after the suppression of the Templars (whose overthrow in England, Scotland, and Ireland, under Edward II, followed

¹ Harris's "Ware," ii., 271.

² This, however, appears to have been originally a Templars' foundation. See Appendix I., p. 314, *infra*.

quickly on their destruction in France by that monarch's brother-in-law, Philip the Fair), the possessions of their ancient rivals were assigned to the Order of St. John. This brought within the authority of the Prior of Kilmainham the wealthy Commandery of the Templars at Clontarf; and in other parts of Ireland the following houses, as enumerated by Ware:—

1. In County Wexford, the Commandery of Kilelogan.
2. In County Carlow, the Commandery of Killergy.¹
3. In County Louth, the Commandery of Kilsaran.
4. In County Waterford, the Commanderies of Kilbarry, Killure,¹ and Crook.
5. In County Tipperary, the Commandery of Clonaul.
6. In County Sligo, the Commandery of Teach-temple.

Of these great additions to the endowments of the Knights of St. John, the Commandery of Clontarf was by far the largest, having been to the Templars, by virtue of its close proximity to the capital, what Kilmainham was to their rivals, the most important seat of their Order in Ireland, though not, perhaps, the richest in point of endowments. After its annexation by the Hospitallers its consequence may, perhaps, have declined through its too near neighbourhood to Kilmainham. Nevertheless, at the suppression of the Order it was valuable enough to be accepted, with the title of Viscount Clontarf, as sufficient compensation to Sir John Rawson, the last Prior of Kilmainham, for the loss of his dignity, precedence, and emoluments.²

Though I have no intention of adding to the intricacies of the story of the Knights Hospitallers in Ireland the even more embarrassing perplexities of the history of their rivals in this country, it is

¹ Killergy and Killure appear, however, to have been original foundations of the Hospital, and not to have belonged to the Templars. See Appendix I., pp. 307, 314, *infra*.

² The Charter of Henry II to the Knights Templars, in respect of his Irish grants to that Order, was put in evidence in the year 1287, in proceedings taken by the Abbot of Dunbrody against the Master of the Templars in Ireland, when its contents were recorded in the following terms:—

“ Henry, King of England, Duke of Normandy and Aquitaine, and Earl of Anjou, to Archbishops, Bishops, Abbots, Earls, Barons, Justices, Sheriffs, and the King's ministers and lieges, Frank, English, and Irish, of all this land. Grant to the Brothers of the Temple to defend the Holy Land of Jerusalem, of mills on the water near Waterford, which water is called Polwaterfour, mills on the water near Waterford, which water is called Innermictam; a vill near Dublin called Clenmthorp, with its appurtenances; Crook with 10 carucates of land; the vill near Waterford whose church is dedicated to St. Barry; a small marsh

impossible to give an accurate impression of the former without a brief notice, for which this is perhaps the least inappropriate point of digression, of the history of the Irish Templars. The Order of Knights Templars or "Poor Fellow-Soldiers of Jesus Christ and of the Temple of Solomon," which had been constituted under the Rule of St. Bernard early in the twelfth century, had, like the rival Order of St. John, emerged from the misfortunes of the Second Crusade in the blaze of martial glory created by the exploits with which their valour before Damascus had redeemed the honour of the arms of Christendom. At the moment of Strongbow's enterprise, France and England were filled with returned warriors whose swords were idle. In the interval between the Second and Third Crusades these monks militant busied themselves mainly in developing the splendid foundations which admiration for the prowess they had exhibited in the cause of Christ had led the sovereigns of Europe, and their nobles, to bestow upon the Order. But many among them were able to spare time from their more monastic functions to an adventure which promised a rich reward for the services they were so well qualified to render. Though it does not appear that the Templars were associated in the same degree as their rivals, the Hospitallers, with Strongbow and the earlier Norman invaders, it is clear that they were not unrepresented in the train of Henry II, when that monarch came over to assume the direction of the enterprise his vassal had begun. Nor was the King slow to recompense the zeal of these knights in his behalf. At the very spot¹ where Henry landed, some seven miles from Waterford, the Templars received a grant of land which became the foundation of the Preceptory of Crook, and to this were added other grants in the south-east corner of Ireland. In Dublin, where any claim they might have laid to Kilmainham was forestalled by Strongbow's grant to the Hospitallers, the Templars received a valuable prize in the grant of Clontarf;

between the King's houses and the sea near Waterford; the Church of St. Aloch near Wexford, with the land belonging thereto, and Agdmile, a burgess of Waterford with all his chattels." (Record and process of a plaint between the Abbot of the Port of St. Mary (Dunbrody), plaintiff, and the Master of the Templars in Ireland, before the King's Justices of the Common Pleas, Dublin.—Sweetman's "Calendar of Documents relating to Ireland," 1285-1292, p. 329.)

A Charter by Henry III, dated 1253, with an inspeimus and confirmation by Edward I, dated 1280, was produced at the same trial. In a confirmation by Henry III in 1227, Agdmile is described as a burgess of Wexford.

¹ As to the identification of Henry II's landing-place with Crook, see an article by Rev. James Graves, in *Journal of R.S.A.I.*, vol. iv., pp. 385-8.

and their possessions were greatly increased by the gifts with which several of the grantees of Henry and of Strongbow endowed the Order. It is unquestionable that in the century and a-half or so which elapsed between the arrival of the Templars in Ireland and their suppression in 1312, they had become an extremely wealthy corporation. But it is extremely difficult at this distance of time to form a just notion of the extent of their wealth. For it is to be observed that the period of their suppression is precisely the period of which the fewest records survive. The thread of Irish history as supplied by official records of the English Government is practically lost during the latter half of the reign of Edward II, when the disorders following the wars of the Bruces submerged the authority of the English Crown through three-fourths of Ireland. We know, indeed, that proceedings against the Templars took much the same course in Ireland as elsewhere, and that after the Order in England had been put upon its trial, under circumstances of harshness and indignity, which were only partially mitigated by the humanity shown by Edward II, the Knights in Ireland shared the fate of their brethren in England and on the Continent. They were arrested and thrown into prison, according to the entry in Grace's Annals, on the day of the Purification of the Virgin, Feb. 3, 1307-8, and were then summoned before the Pope's Commissary, sitting in St. Patrick's Cathedral. Though it is not recorded that any of the graver offences alleged against their brethren abroad were imputed to them, they were unable to escape the fate of their fellows elsewhere.¹ Whether guilty or innocent, the Irish Templars were inevitably involved in the general suppression of their Order by the Bull of Pope Clement V in 1312, and that suppression was followed by the dispersal of a great part of their property among various grantees of the Crown. The principal commanderies and actual

¹ "Between the 11th of February and the 23rd of May (1310), thirty Templars were examined in St. Patrick's Church, Dublin, by Master John de Mareschall, the Pope's Commissary, but no evidence of their guilt was obtained. Forty-one witnesses were then heard, nearly all of whom were monks. They spoke merely from hearsay and suspicion, and the gravest charges brought by them against the fraternity appear to be that the Templars had been observed to be inattentive to the reading of the Holy Gospels at church, and to have cast their eyes on the ground at the period of the elevation of the Host." Thus Addison in his "History of the Templars," p. 234; but his dates do not appear to be quite accurate. The trial of the Templars, as distinguished from the preliminary investigation before John de Mareschall (who was Commissary of the Bishop of Kildare, not, as Addison says of the Pope), was held before a tribunal of Dominicans, the accusers being members of

foundations of the Templars undoubtedly passed to the Hospitallers, but a substantial proportion of the endowments formerly allotted to them was in all probability irrecoverably alienated. True it is that under a further Bull of the same pontiff, the Knights of St. John, in reward of their recent display of prowess against the Moslem infidels in the capture of Rhodes,¹ were declared the inheritors of the possessions of their despoiled rivals throughout Europe. But it by no means followed that this Papal title was everywhere recognized. Of what happened in Ireland we have no record. But if events in this country followed the course pursued abroad, it is unquestionable that much of the property of the fallen brotherhood passed into lay hands, and never reached the new grantees. For the European monarchs, who had seconded the Papal denunciations of the Templars largely in hopes of benefiting by the spoliation of so wealthy a community, saw no direct advantage in the aggrandisement of the Hospitallers. Abroad, it has been computed, "the Hospitallers never obtained a twentieth part of the ancient possessions of the Templars."² In England, Edward II declined to recognize the Pope's title to dispose of property without the consent of the Crown, and pending the grant which he ultimately made at the end of 1313 confirming the Hospitallers in the ownership of the Templars' lands, he made numerous assignments of their possessions to other hands, resulting in an irrevocable alienation of much of the confiscated property to lay purposes. In spite of our lack of any records of the course of the proceedings in Ireland, we may assume with considerable confidence that what Edward II did in England his ministers in this country were not slow to imitate; and that, although the Knights of St. John undoubtedly became the legal successors in title to the Templars, and in 1314 were formally instituted into the possession of all the lands and possessions of the latter,³ they were far from realizing the whole of the splendid heritage assigned to them.⁴

the Franciscan and Augustinian Orders in Dublin. Much of the evidence taken against the Templars in Ireland will be found in Wilkins's "Concilia," vol. ii., pp. 373-380.

¹ A.D. 1310.

² Addison's "History of the Knights Templars," p. 211.

³ Dowling's Annals.

⁴ The late Dr. Richard Caulfeild printed in the Journal of the Royal Historical and Archæological Association of Ireland, 4th series, vol. ii., pp. 331-334, from a manuscript in the British Museum entitled *Monastic Records, Ireland* (6165 Plut.,

If it be difficult to trace the record of the Hospitallers in the service of the State otherwise than in the merest outline, or to identify with exactitude the extent of their numerous and widely extended property, it is assuredly a no less perplexing task to attempt to ascertain the form of their social system, or to arrive at a notion of their mode of living. It would add much to the reality of our conception of mediaeval Dublin could we attain to something like a just view of the daily life of these Knights, and of the character of their intercourse with the citizens of Dublin. But we possess no sufficient materials for such a picture. No such admirable illustration of life in a fourteenth-century Priory as is supplied by the "Account Roll of the Priory of the Holy Trinity, 1337-1346," has been preserved to inform us how the Hospitallers of Kilmainham, lived, moved, and had their being. We must, therefore, content ourselves with such occasional and unsatisfactory glimpses as the State papers give us of the life of the Hospitallers generally, and more particularly of those of Kilmainham.

The Irish Hospitallers appear to have enjoyed, in common with the Templars, the special immunities which were granted in England to both Orders by Henry II, and confirmed by his successor. A Charter in the first year of King John extended to the Knights Hospitallers in Ireland the liberties granted in the previous year to their English brethren. These included "freedom from actions, the King's toll, passage, pontage, vinage, wayte, carriage, sumage, works regarding castles, parks, bridges, and vivaries (*i.e.* preserves), army and cavalry summonses, aids and tallage, wastes, regards of the forests and assarts, amerciaments; besides freedom from forfeitures of property by their retainers, and from being impleaded before the King's Justiciary in civil matters."¹ From the nature of their property, as indicated by the records of sundry civil actions to which the

clxxi. D), an account of the property of the Knights Templars in Ireland in the year 1307, on the suppression of the Order. This contains a list of all the Manors and Churches then in their possession. It is curious that this list does not enumerate a single possession in Ulster or Connaught, notwithstanding a licence given to the Templars by Henry III in 1234, to have "a free guest in every County and Borough in Ireland"; and in point of fact the establishments of the Templars, unlike those of the Hospitallers, appear to have been confined, with the sole exception of the Preceptory of Teach-Temple in Sligo, to the provinces of Munster and Leinster, and more particularly to the south-eastern parts of these provinces.

¹ Sweetman's "Calendar of Documents" (1171-2511), p. 19.

Hospitallers were parties at various periods, and from the inventories of their goods taken from time to time, we may gather that each Preceptory was possessed of very large agricultural interests, with a large home farm adjacent to the Priory. Mills were in many cases, and particularly in that of Kilmainham, which had large mills on the Cammoge stream, an important feature in the domestic economy of the Preceptories. There can be little doubt that the Hospitallers were in general the overseers of the milling industry, and the owners of the granaries of the districts in which they were established; though the existence of the King's mills at Dublin Castle in close proximity to Kilmainham, must have prevented the Hospitallers of Kilmainham from enjoying anything like a monopoly of the milling industry in Dublin. The Templars, in their day, seem to have been very extensive wheat-growers, doubtless in consequence of their proximity at Clontarf to the celebrated wheat-growing lands of Fingal and of the north portion of the County Dublin. In the thirteenth century, indeed, both Orders appear to have been extensively concerned in the corn trade, and to have been the principal distributors of flour through the country. In 1225, for example, the master of the Templars in Ireland was licensed for five years by the King, "to convey his wheat whither he will throughout all Ireland for trading purposes,"¹ without being impeded; and in 1243 a royal mandate enjoined upon the Justiciary that no mill should be built in Waterford to the damage of the Templars' mills there, and that he should cause any mill already erected to their injury to be razed.

The owners of the Preceptories, like those of most monastic establishments in the Middle Ages, were also much interested in the fishing industry. The once valuable salmon fisheries of the Liffey were closely looked after by the Hospitallers of Kilmainham, who in consequence sometimes came sharply in conflict with the citizens of Dublin. The thirteenth-century suit between the Hospital and the City has already been mentioned. That dispute does not seem to have been the first in which the same parties found themselves at issue. A mandate issued to the Justiciary as early as the year 1220 recites how "the good men of the King's City of Dublin" claimed that the City was entitled to have the water-way of the Liffey so kept open, that provisions could be sent up and down the river in boats, and further that they had always had a fishery on that river; and also how they complained that "the Prior and Friars of the Hospital

¹ Sweetman's "Calendar of Documents" (1171-1251), pp. 193 and 396.

of Kilmainham have lately made a pool there, whereby the city and citizens are much damnified, their fishery is totally destroyed, because the pool prevents the fish from ascending, and their boats can no longer pass up and down as they used to do."¹ The Justiciary was directed to rectify this abuse by enlarging the river; but the feud between the City and Hospital—in the course of which the Hospitallers broke the citizens' nets, while the citizens retaliated by destroying the Hospitallers' mill—does not appear to have been composed until after the Hospitallers had successfully vindicated their title in the courts, when, as already mentioned, an amicable arrangement was made as to the future exercise of the fishing rights. At the period of the litigation in the thirteenth century between the Hospital and the City, the interest of the Knights of St. John in the Liffey Salmon fisheries was confined to the waters of the river above the city. But a century later, when the annexation of Clontarf had brought them whatever rights the Templars had been wont to exercise at its mouth, the Hospitallers were careful to vindicate their title to the tithe of salmon there taken. Among the Christ Church Deeds is an agreement with reference to the tithes of salmon taken at Poolbeg, in settlement of a suit brought by the Hospitallers against four takers of salmon there, under which the title of the Hospital to such tithes was acknowledged, notwithstanding that Sir Robert Dowdall, the Lord Chief Justice of the day, had held a lease for several years of the farm of the manor of Clontarf.²

A further glimpse into the domestic economy of the Knights of St. John in Ireland is afforded by the institution of guest-houses or hostelries attached to the various Preceptories in the more important towns. The Hospitallers, pursuant to the Charters in that behalf granted to both the military Orders, had establishments in Dublin and the principal towns, to which the Knights could resort for accommodation in their journeys. In Limerick, Trim, and Ardee, among other places, these guest-houses existed. The agreement of the Prior and Brethren of Kilmainham with Henry Marshal, the custodian of their *Liber Hospes*, or guest-house, in Dublin, gives us some insight into the nature of the arrangement between the brethren and their innkeepers, besides indicating the kind of accommodation provided in an inn of the better sort at the close of the thirteenth century. This

¹ Sweetman's "Calendar of Documents" (1171-1251), p. 149.

² Appendix to the 20th Report of Deputy Keeper of Public Records in Ireland, p. 91.

guest-house stood in Winetavern street, then a very important thoroughfare, the seat of the Guildhall, and the fashionable quarter for visitors. It appears from the record of the agreement in the State papers that the Prior and Brethren at Kilmainham, having acquired the interest of Henry de la Felde and Petronilla, his wife, in "a stone-house, near the Church of the Holy Trinity, Dublin, on the north side," which one "Henry, called Marshal, Citizen of Dublin," held at the yearly rent of one penny, did let the house to Henry Marshal and his heirs, "with all liberties and free customs thereto belonging, at a rent of two silver shillings and one penny a year." The Prior and Brethren had just previously received by letter, under the seal of Walter Vured, the Mayor, and the Commonalty of the City of Dublin, "a grant that the house aforesaid should be their free hospital, and should be for ever quit from all exactions, tollages, demands, or collections of money." They accordingly granted to Henry Marshal that he should be "their free guest in the stone-house aforesaid," and as such that he should enjoy all liberties granted to their other free guests in Ireland. In requital whereof Marshal undertook that he and his heirs should "find for the Prior and Brothers and their successors whenever they shall go to Dublin and shall wish to remain, decent entertainment and stable, white cloth, white salt, white candle, fire, litter, and cooking utensils"; and he further obliged himself to leave to the Hospital at his death "forty shillings of silver in the name of one-third of all his chattels." As this instrument was witnessed by the Masters of several of the country Preceptories, we may fairly conclude that the Winetavern street hostelry was the common place of resort for all Hospitallers coming from the provinces to sojourn temporarily in the capital. This *Liber Hospes* was maintained for the Hospitallers down to the dissolution, being mentioned in the Inquisition of 33rd Henry VIII. as "a house called the Frank House, in Winetavern street, Dublin, near the Church of the Holy Trinity."¹

More appropriate to their spiritual than to their secular character was the exercise by the Hospitallers of parochial jurisdiction over certain parishes, in possession of which they were placed by the diocesan authorities. A grant preserved among the Christ Church deeds supplies an example of what appears to have been a not

¹ Sweetman's "Calendar of Documents" (1285-1292), p. 361; and see Gilbert's "Calendar of Dublin Records," vol. i., pp. 104, 198; and "Historical and Municipal Documents," p. 501.

uncommon practice. By this indenture Alexander, Archbishop of Dublin, granted to the Prior and Brethren of Kilmainham, in the year 1319, "the Parish Church of Rathmore (in the County Kildare), with its chapels, tithes, and obventions, for the sustenance of pilgrims and the necessities of the poor," and instituted the Prior in the name of his house in the corporal possession thereof.¹ The Hospitallers, who, on their part, appear to have been bound to give ten pounds of wax yearly for the use of the Church to the Chapter of Christ Church, retained their rights in the Rectory of Rathmore down to the dissolution of the religious houses.²

III.

THE PRIORS OF KILMAINHAM.

The attempt to follow the fortunes of the Hospital of Kilmainham, in its relations to the general history of Ireland during the Plantagenet era, and to form a just conception of the part played by the Hospitallers in the government of the country, is rendered extremely difficult by the almost total absence of any Irish records directly referring to the Order. It unfortunately happens that the archives of the Knights of St. John (which, despite the many vicissitudes of their

¹ Calendar of Christ Church Deeds, Nos. 207, 208.

² Monck Mason, in his MS. additions to his account of Kilmainham Priory in Archdall's "Monasticon," has the following note:—

"There was at this time a dispute with the Archbishop of Dublin with regard to his right of visiting those churches of his diocese which belonged to this Priory, and appropriated *in proprios usus*—viz., Rathmore, Ballyogary, Chapelizolde, Crevaghe, Ballythermot, Rathenanys, Calveston, Davystowne, Stafyhnane, Rathsilly, Fountstown, Leyston, and Ballycolian, with their appendant chapels; and the Archbishop cited them to exhibit their titles to exemption, if any they had, as likewise in respect of the churches of Kilmainham, Kilhale, and Clontarf, which the Prior and Brethren asserted they possessed *pleno fare*. The Prior pleaded that the three latter had been, time out of mind, subject to him in every way, both in temporals and spirituals; that they were exempted specially by the Apostolic See from all ordinary authority, and subjected immediately to the Holy See; that the other churches above-named were theirs *in proprios usus*, and subject immediately to the Holy See, saving to the Archbishop and his successors their procurations on visiting the same; and reserving to the Archbishops their jurisdiction in matters concerning the cure of souls: all which was admitted and certified by the Court *in capella Sti. Sepulchre*, 7mo. Sept., 1360.—Al. Reg. T.C.D., f. 301."—Wm. Monck Mason's MS. Notes to Archdall's "Monasticon Hibernicum." Brit. Mus., Eg., 1774.

fortunes and the successive migrations of the Grand Preceptory from Jerusalem to Acre, from Acre to Cyprus, from Cyprus to Rhodes, from Rhodes to Crete, and from Crete to its latest seat in Malta, remain, in many respects, extraordinarily perfect) are sadly inadequate in relation to the annals of the Order in Great Britain and Ireland. While the succession of the Grand Masters of the Hospitallers, and that of the Grand Priors of the several *Languages*—the name given to the various provincial organizations throughout Europe—have been preserved with tolerable completeness in the Library at Malta, the official records contain only the most fragmentary references to the Priors and Preceptories of the Three Kingdoms.¹ Nor is this deficiency made good by any extant records elsewhere. For the statistics published in Larking's "Knights Hospitallers of England in 1338"² deal solely with the property held by the Order in that country, and the book takes no note of the general history of the English and Irish Knights. Such information as can be gleaned regarding the doings of the Order in Ireland is, therefore, inevitably scrappy and unsatisfactory. Even when all the items have been laboriously pieced together, they fall very far short of supplying the materials for a consecutive chronicle; and the task of reconstructing the organization of the Irish branch of the Language of England from the few scattered and inconsiderable bones of knowledge that survive, is one that must baffle the most skilful and ingenious of historical anatomists. It is possible indeed to make a very fair approximation towards the succession of the Priors of Kilmainham,³ and a list of the Priors of Ireland—who are not necessarily identical with the Priors of Kilmainham—from the year 1330 to the dissolution of the Order, will be found in Porter's "History of the Knights of Malta."⁴ But except that a comparison of these lists with those of the Grand Priors, Turcopoliers, and other officers of the English Language, proves that the Irish branch had no independent existence, the heads of its Preceptories being in many cases appointed from among the Knights resident in England, these records throw no real light on the history of the Hospitallers in Ireland. Yet, though the amount of our positive knowledge is small, there are, nevertheless, indirect

¹ See "Les Archives de la Bibliothèque et le Trésor de L'Ordre de Saint Jean de Jérusalem à Malte." Par J. Delavalle le Roux. Paris, 1883.

² Camden Series (old series) vol. lxxv.

³ See Appendix II, p. 316, *infra*.

⁴ Vol. ii., p. 296.

sources from which we may infer that the status enjoyed by the Knights Hospitallers in Ireland was not inferior to that universally accorded to their brethren throughout Europe in the hey-day of their prosperity. Thus, from the earliest period for which such records are available, the Prior of Kilmainham or his *locum tenens* appears to have been summoned among the barons as a spiritual peer of Parliament,¹ while the rolls of the great officers of State, and of the heads of the judiciary, show that the Lords Priors of the Hospital were closely associated with the work of government, and were often entrusted with the highest administrative functions. As many as four among them held the great office of Lord Deputy, and at least two of them appear to have held Parliaments in the great hall of Kilmainham; while the names of no fewer than seven of the Priors are to be found upon the distinguished roll of the Lords Chancellors of Ireland.² The Hospitallers also appear to have exercised in early times, in conjunction with the Templars, some of the functions of treasurers or bankers, the Lords Justices in Henry the Third's reign being instructed to lodge at Kilmainham the aid collected for the King, for transmission to England by the Knights.³

But great as was the part played by the Priors of Kilmainham in the business of government, and in the administration of the law, it was, as befitted their important position in the great military Order of Knights Hospitallers, less as statesmen or as judges than as soldiers that their most eminent services were rendered. Military service to the Crown was manifestly the principal consideration for those extensive grants which were made by the early Plantagenet Sovereigns both to the Templars and to the Hospitallers. It is clear that the two Orders performed between them many of the duties of a garrison, and that the Preceptories and Commanderies, with the fortified castles which everywhere adjoined them (and which in most cases were built on sites strategically advantageous), served as so many citadels of Anglo-Norman authority in the provinces. As the wealth and authority of the Hospital at Kilmainham grew, the military importance of its rulers steadily increased. Those Priors who took an active part in public affairs appear to have joined

¹ See Lynch's "Feudal Dignities."

² *Vide* Lascelles' "Liber Munerum Publicorum Hiberniae."

³ Sweetman's "Calendar of Documents" (1171-1251), p. 147. It appears from a letter printed in the "Carew Calendar" (1515-1574), p. 42, that the Prior of Kilmainham held the office of Under Treasurer in 1434.

to their administrative functions the position of generalissimo of the forces of the Crown, and the Knights grew to be considered the flower of the Royal army. Normans and strangers to a man, and owning fealty to the English rulers of the country, neither Hospitallers nor Templars seem to have had the smallest sympathy with the native Irish. Their military record in Ireland is mainly the story of expeditions, by no means invariably successful, undertaken to quell the revolts of insurgent chiefs. Thus, in 1274, Prior William Fitz-Roger commanded a contingent of the army led by Thomas de Clare into the fastnesses of Wicklow, and, after losing many of his Knights in battle, was taken prisoner by the Irish in Glenmalure. The Prior does not seem to have been in any hurry to undertake this enterprise, for when commanded by Edward I to return to Ireland for the defence of that kingdom, he pretended to have received a summons from his Superior to the Holy Land. But the King would stand no nonsense, and being ordered to Ireland "on pains of the loss of all the lands of his house in that country," the Prior obeyed the mandate and returned to Kilmainham. But, though captured at Glenmalure, Fitz-Roger survived to fight another day; and a few years later he is found at the house of his Order at Randon, in Roscommon, preparing "to lead an army against the King's enemies in Connaught."¹

But the military activity of the Prior of Kilmainham and his Knights was by no means confined to Ireland. They were also liable to be called on by the Crown for service abroad, and on such occasions they bore a highly honourable place in the armies of the English Kings. Of what services, if any, they rendered on the stricken fields of Crecy and Poitiers, we have no record; but that their prowess was fully appreciated by so martial a sovereign as Henry V we know from the story of the siege of Rouen. Doubtless, the most chivalrous figure in the dim procession of these vanished representatives of the religious chivalry of the Crusades is that of Thomas le Botiller, Prior of Kilmainham and Chancellor of Ireland, the doughty warrior monk who led the Irish troops across the seas in the service of Henry V, in the year 1418. This Prior was an illegitimate scion of the house of Butler, a son of James, third Earl of Ormond, and a man of equal ability as soldier and as statesman, who twice filled the office of Lord Justice of Ireland. The Prior's exploits at Rouen are picturesquely recounted in the quaint verses of John Page, who was himself present at the siege.

¹ Sweetman's "Calendar of Documents" (1252-1284), p. 200; and (1235-1292), p. 369.

The poem tells how the Prior of Kilmainham, arriving at Harfleur at the head of a contingent of fifteen hundred men, was allotted the post of honour and of danger by King Henry, who directed him to repel the attack which the French Monarch, assisted by the Burgundians, was expected to deliver with the object of raising the siege :—

“ And then the Pryor of Kilmaynan
 Was come wyth yn the mowthe of Sayn.
 At Harflete he loded evyn,
 With XV. Hundryd fyughtyng men,
 Well a-rayde of warre wyse,
 As the cuntraye hathe the gysse.
 Faste he hyed unto the sege,
 And was well-come unto our lege.
 Then was sayde the Fraynysche Kyng
 And the Burgaynys caste hyr entrynge
 In the northe syde of our oste,
 For the cause there was playne moste.
 The priour with his XV. hundred men
 Our kyng assygnyd a yenne,
 To logge hym in that syde
 For to kepe the wayes wyde
 By the Foreste of Lyones stoute
 To kepe the Fraynysche men owte,
 He loggyd hym with owte that woode,
 And made wacche and ordynaunce goode
 Withowte our oste iij legys large,
 So for to logge hyt was hys charge.
 The knyght thenne there-to sent,
 And manfully thedyr wente.
 Yf the Fraynysche men ofte wolde there that way
 The fryste frunt he thought to fray.
 Moche worschyppe wanne he there,
 And soo he hadde done ellyswhere.
 And moche worschyppe there he wan
 I wolde you telle but alle I ne can.”¹

Prior Butler had a martial successor in the next reign in the person of Prior Thomas FitzGerald, a grandson of the Earl of Kil-

¹ “*Historical Collections of a Citizen of London in the Fifteenth Century*”: Camden Society’s Publications, Third Series, pp. 12, 13.

dare, and consequently a member of the rival house of FitzGerald. The "Chronicle of William Gregory, Skinner," tells how in the year 1446 this Prior of Kilmainham exhibited his knightly prowess after the most approved fashion of mediæval chivalry by appearing fully armed in the English capital, ready to bid defiance to his hereditary foe:—

"And that same yere there was a pechyng i-made upon the Erle of Ormounde by the pryour of Kylmayn for certaine poyntys of treson, the whyche was takyn into the Kyngys grace, where upon hyt lykydoure soverayne lorde to graunte a generale pardon unto the sayde Erle. But nevyrtheles the sayde pryour appayryde in Smethefylde the iiij day of the monythe of October, as hyt was apoyntyde, fulle clenly harnyssyd, redy whythe alle hys fetys and whythe alle hys wepyns, kepyng the fylde tulle hyghe none."¹

But, as Professor Richey has observed,² if the Knights of St. John were generally useful auxiliaries to the Government, they could sometimes prove dangerous from their turbulence. The development of this undesirable side of their activity was in part due, no doubt, to the enfeeblement of English authority consequent on the dynastic contentions in England. But it was also in part due to the introduction of a new and different vein of political sentiment into the leaders of the Order in Ireland. The Priors of the latter half of the fifteenth century reflect, in their altered attitude towards the English Crown, the change which during the same epoch had transformed a great part of the Anglo-Norman nobility of Ireland into a semi-independent baronage, largely imbued with an Irish spirit. It has been observed by D'Alton "that a singular circumstance may be remarked in reference to the succession of the Priors of this house, many of whom held the highest office of the State, that the name of one person of the ancient Milesian stock does not appear in the whole series, and perhaps this remark would apply to all the Preceptories belonging to this Priory throughout Ireland." In view alike of the constitution of the Hospitallers' Order and of the circumstances under which it was introduced into this country, this is a feature in the history of the Priory which can scarcely surprise us. The Order was essentially cosmopolitan. Its establishments in Ireland were directly subject to the authority of the Grand Master, which, though exercised for the greater part of the period with which we are concerned from an island so remote

¹ Camden Society's Publications, Third Series, pp. 186, 187.

² "Short History of the Irish People," p. 289.

as Rhodes, was no phantom jurisdiction. A statute of Henry VI passed by the Irish Parliament in 1447 indicates the mode in which that authority was enforced. A Visitor-General appointed for the purpose by the Grand Master, and invested with plenary powers of deprivation, was despatched to Ireland, and was licensed by Letters Patent from the King, to put the Bulls of the Grand Master into execution. The Act recites how the Visitor "in a general chapter held before him at Drogheda, by the advice of the brethren and the council of the said Hospital for the contumacy, contempt, rebellion, and dilapidation of the goods of the said hospital, and the non-payment of the annual pension to the said Lord Master of the Rhodes, deprived Thomas FitzGerald of his 'prioralty,' and appointed Thomas Talbot in his stead." Thus the Order could make its power felt from the far east to the far west of Europe, and the Grand Master's authority could reach from the Levant to the Irish Sea. Furthermore, the Irish establishment of the Order was apparently regarded as a branch of the English Language, as the province was called, and the appointments to the office of Prior of Ireland, which were made at Rhodes, were usually filled from the Preceptories of the flourishing English Hospitallers, whose principal house is commemorated in St. John's Gate at Clerkenwell, and in the name still attached to one of its principal possessions, the important district of modern London known as St. John's Wood. Thus, in the earlier half of the history of the Order in Ireland, the Priors of Kilmainham were almost exclusively Anglo-Normans; and it is not until the fifteenth century that we find the names of such great Anglo- or Norman-Irish families as those of Butler, FitzGerald, and Talbot on the roll. Thenceforward, however, the Priors appear in a character political rather than military or monastic; and in place of manning the Government of Ireland, as their predecessors had done, they seem rather to have become permanent chiefs of an anti-English opposition. Nevertheless, despite some vague traditions of the grandeur and importance of some of the earlier heads of the Hospital, as Roger Utlough and Ralph de Ufford, it is the names of those later Priors who flourished under the Lancastrian sovereigns, together with that of James Keating, whose stormy priorate belonged to the reign of Edward IV, Richard III, and Henry VII, and embraced the unfortunate adoption of the cause of Lambert Simnel, that must occupy, in the absence of any personal record of their predecessors, the most conspicuous place in the roll of the Priors of Kilmainham.

The great period of the Hospitallers in Great Britain may be said

to have passed with the second monarch of the House of Lancaster. The Order had by this time long outlived the circumstances of its origin. The Crusades were already a tradition, and the knights who had been dubbed as soldiers of the Cross had become at best the militia of the English king. The era of the French wars had provided them, indeed, with a field which, however mundane, was not inappropriate to the display of their more chivalrous qualities. But the smaller stage provided by the Wars of the Roses gave scope only for their less excellent aptitudes, and the brotherhood quickly degenerated from a spirited soldiery to what was little better than a noxious banditti. A change appears to have taken place, too, in the characteristic qualities previously required of the Priors, if not of the knights generally. They were no longer selected from the English houses of the Order, but were chosen from within the ranks of the Irish brethren. They thus came to have local and personal interests as distinguished from those of their Order, and to subordinate their official functions to their personal concerns. The knightly Prior Butler had for his immediate successors a trio of turbulent Superiors, who took full advantage of the civil disorders of the realm to lord it over their neighbours, and who were so far from paying regard to their religious vows that they did not scruple to squander the revenues of the Hospital on the aggrandisement of their personal fortunes, and to misappropriate its treasures. It is evident from the proceedings of Priors FitzGerald, Talbot, and Keating that in the latter half of the fifteenth century the Priory of Kilmainham had lost much of its ancient consideration, and that it had degenerated, through the rapacity of its temporary chiefs, into a selfish corporation, powerful only for mischief, and scarcely giving even a nominal homage to the great and sacred purposes for which the Knights of St. John had originally been constituted. Two further Statutes of the Irish Parliament in the reign of Henry VII indicate plainly the extent and gravity of the disorders which arose. The first of these, passed in 1494, "at the supplication of Sir John Kendall, Prior of St. John's, Jerusalem, Within his realm of England, in the name of the Lord Great Master of the Rodys," sets forth that although the Order in Ireland was "founded and endowed honourably with many and divers great lordships and possessions," yet "forasmuch as by the course of the great debates and dissentions which have been betwixt lords spiritual and temporal and others of the said land," the rents and revenues thereof had greatly decayed. A second Statute passed in the same year is more precise in defining the causes of this impoverishment of the Order. It recites that "Sir James Ketyng, pretended

and intruded prior, . . . and other his predecessors, late priors of the same priorate, by their mys-governance and mys-gidyng have greatly impoverished the said priorate; and over that . . . ev'ry of them in the tyme they were priours ther have sold and laid to pledge almoste all the reliques, juells and ornamentys, and yn especiall a p'cious relyque or pece of the holy crosse belonging to the said priorate, against all due order of ther religion."¹

The misdeeds of Prior Keating were not confined to offences against the interests of his Order; and we may suspect that the Parliament of Henry VII would scarcely have shown so much zeal for the good government of the Hospitallers had the latter extended to the new Tudor dynasty the active support which had been traditionally rendered by the Priors of Kilmainham to the reigning sovereign. Prior Keating, however, had been very far from following the examples of his predecessors in this respect. His twenty years' tenure of the priorate was one long scene of storm and violence. His hand seems to have been against every man. The king and his subjects, the clergy and the laity, and even his Superiors and the brethren of his own Order, seem to have been equally the objects of his impartial hostility. In 1478, he held Dublin Castle, of which he had been appointed Constable, against the Deputy of Edward IV, and destroyed the drawbridge. In 1482, having been deprived of the priorate by the Master of the Rhodes for the crimes specified in the Statute already cited, he bid open defiance to his Superior, imprisoning Sir Marmaduke Lomley, the knight appointed to succeed him. Keating's performances on this occasion are set out in another of the many Statutes which his excesses provoked. Chapter xvi of the 10th Henry VII recites how collation being made by the Grand Master of "a gentleman of the same religion, born within the realm of England, named Sir Marmaduke Lomley, late deceased, which Sir Marmaduke going into Ireland for to attain the same priorate according to the collation and gift of the said Great Master was there taken by force by the said Sir James Keating and his retinue, and the bulls and writings of the said Great Master taken away from him, and so cast into prison by the said Sir James, by the occasion whereof the said Sir Marmaduke died."² Lastly, to complete the catalogue of

¹ Unpublished Statutes of Ireland at the Public Record Office.

² Lomley addressed a letter of complaint to Henry VII, in the following terms:—
MARMADUKE LOMLEY'S LETTER TO HENRY VII, ex Registro Octav. de Palatio, f. 115.

"Most high and mighty Prince, and my most redoubted sovereign liege Lord, in my most lowly wise I recommend me unto your most Royal Majesty—Please it

his offences, this lawless prior was one of the foremost to promote, in the language of yet another Statute, "the great and damnable abusion and error that was of late had in the crowning of the lad," Lambert Simnel. It is scarcely to be wondered at that Sir Richard Edgecomb, who was sent to Ireland by Henry VII, armed with full powers to deal with the disorderly factions by which the country, or more correctly the Pale, was then torn, should have turned a deaf ear to the persuasions of the Earl of Kildare and others who sought to procure a pardon for Keating. So far was he

your most Excellent Grace to have the knowledge how that after it liked the Lord Master of Rhodes to have proceeded according with the staplements of the Order of the Hospital of St. John of Jerusalem against one Frere James Ketyng, late Prior of the same Hospital, in this the land of Ireland for his demerits, rebellions and inobediencie done unto the aforesaid Lord Master in order to his utter deprivation of the said Priory, and all other offices and commanderies which the said Frere James Ketyng have occupied until that time within the said land of Ireland, and upon the same deprivation so once to have graunted and given unto my right simpleness, not worthy thereto, the aforesaid Priory, and to have provided me of the same by his Letters Patent, and so have pleased our most Holy Father the Pope to have confirmed the aforesaid deprivation, graunt, leave and permission like as is above rehearsed: as may more plainly appear by our said most Holy Father his bulls thereupon directed: and inasmuch as I by special commandment of the said Lord Master taking on me the charge of the foresaid Priory with letters evidences and writings as well of the said Master as of our foresaid most Holy Father necessary in that behalf, when I arrived at a village called Clontarfe two miles asunder from the City of Dublin, there the said Frere James set on me with a number of people, a horseback and a foote, and there violently putting hand upon me took me thither as pleased him and kept me like a prisoner, until the time that by compulsion of dread of my life I must have delivered there as it pleased him all manner evidences, writings, bulls and letters, which I brought with me in that behalf into Ireland; saying and protesting openly that notwithstanding that I suffer the said Frere James by compulsion before rehearsed to occupy foresaid Priory, mine intent is in no manner of wise to renounce my title in the foresaid Priory; and so from thence I being in a strange country was so adread of my bodily death by the strength and inordinate disposition of the said Frere James, durst not certify our said Holy Father, your Highness, neither the foresaid Lord Master of the premises until this time that I have obtained the favour of gentyles and certain port towns within your said land of Ireland. Wherefore I most humbly beseech your most affluent Grace to provide of a due remedy in that behalf according to the pleasure of your most noble Majesty. And most High and Mighty Prince, and my most redoubted Sovereign Liege Lord, The Blessed Trinity preserve always your most Royal Estate in continual prosperity, and grant you the victory of your enemies bodily and ghostly."—Harris's *Collectanea de Rebus Hibernicis*, vol. xiv., pp. 230, 231.

from doing so that, as the historian of Edgecomb's mission tells the tale, he "gave with a manful spirit unto the said prior fearful and terrible words," and, refusing to extend the Royal clemency, forthwith removed him from the Constablership of Dublin Castle.¹ It was not until three years later, however, that the prior was with difficulty removed from Kilmainham. It is not surprising that Keating's sustained and almost successful treason should have thoroughly alarmed the Government, which showed its sense of the power for good or ill of a Prior of Kilmainham by procuring the passing of a Statute confining that dignity for the future to persons of English birth.²

With the disappearance of Prior Keating the history of Kilmainham Hospital as a great factor in the social and political life of Ireland comes to an end. The Priory had dwindled to the shadow of its former self forty or fifty years before the dissolution of the monasteries formally completed its destruction. The four Priors who succeeded Keating were Englishmen and law-abiding subjects of the Crown. But they do not appear to have had the slightest influence in public affairs, or indeed to have sought to

¹ Voyage of Sir Richard Edgecomb in Ireland; printed in Harris's "Hibernica."

² This Statute, passed in the tenth year of Henry VII, runs thus:—

"Item at the supplication of the Commons of the Land of Ireland, that whereas, the hed-house and priorate of St. John's Jerusalem within the same land, hath been above all other houses and places of religion the most honourably and nobly founded and endowed with possessions spiritual and temporal, of which possessions great part thereof hath desolated for lack of good order, rule and governance, and also much thereof is granted and aliened under the convent seal of that place, by means of such evil-disposed persons which have been late priors there taking no regard to their conscience nor to the honour and weal of that noble Order whereunto they were professed, which is among other great causes of misgovernance and evil order of the said land; for such a gentleman being prior there putting that livelihood in good appovement to the use and behoof of the said priorate was able to have the rule and governance of a great part of that land. Therefore it be ordained, enacted and established by the authority of the present Parliament, by the assent of the lords spiritual and temporal here assembled, that from henceforth he that shall be made prior of the said priorate of St. John's Jerusalem in Ireland, by the Lord Master of the Rhodes, or by his Deputy, by the King's assent, having sufficient power and authority in that behalf, shall be a man of the English blood, sad, wise and discreet, one as shall have livelihood by the religion within the realm of England, whereby the King's grace shall be more faithfully and better served in these parts of Ireland and the yearly resposion which ought to be paid to the Rhodes by the prior of the said priorate for the maintenance of the Christian faith well contented and satisfied hereafter."

exercise it. The facility with which the last Prior surrendered his great ecclesiastical dignities in exchange for a viscounty and a grant of the manor of Clontarf is evidence in itself of the decadence which had taken place in the tone and spirit of the Hospitallers. Nowhere among the many preceptories does there appear to have been any serious resistance to the Royal will, when the decree for their suppression was pronounced. For the rank and file of the brethren provision appears to have been made, and its leading members were treated with consideration. The head of the Preceptory of Any, for example, was appointed to the bishopric of Emly, and others among the knights received considerable ecclesiastical preferment, while some were placated like their chief by substantial grants of Hospitaller property.

It is a curious circumstance that at the accession of Mary the Hospital of Kilmainham was made the sole exception to the policy of her advisers, which forbore to attempt the restoration of the suppressed monasteries. By the Act of the Papal Legate Cardinal Pole, one Oswald Massingberd was designated Prior in 1557, and the Order was restored to its possessions. The peculiar favour thus shown was doubtless due to the importance of the position still occupied throughout Catholic Europe by the Knights of St. John. But its effects were of course only shortlived. On the accession of Elizabeth, Massingberd fled over sea, and the Hospital was finally annexed by Statute to the Crown.¹

¹ For some notes on the subsequent vicissitudes of the Priory, see the present writer's "Illustrations of Irish History and Topography," pp. 45-48; and see also the paper on "The Phoenix Park," in R.I.A. Proceedings, Third Series, vol. vi., p. 465.

APPENDIX I.¹

A LIST OF THE PRECEPTORIES OF THE HOSPITAL OF ST. JOHN OF JERUSALEM IN IRELAND, CONNECTED WITH THE PRINCIPAL HOUSE OF THE ORDER AT KILMAINHAM, WITH NOTES ON THEIR ORIGIN, AND ON THEIR DESTINATION AFTER THE DISSOLUTION OF THE MONASTERIES.

Preceptories of Templar origin are marked with the letter T.

I. COUNTY DUBLIN.

T. *Clontarf*.—Granted to the Templars by Charter of Henry II, given at Avanches in Normandy, probably in 1172. In that

¹ This List is confined to those houses of the Hospitallers which may properly be described as “preceptories,” or “commanderies,” i.e., residential seats of the Order in direct connexion through their principals or “preceptors” with the administrative organization of the Knights of St. John. Besides these, both Hospitallers and Templars held important and valuable possessions, which were administered by the preceptories or commanderies to which they respectively belonged or were adjacent. Such possessions usually comprised manors, lands, and houses, besides ecclesiastical property, as rectories, tithes, advowsons, &c.; and sometimes extended through several counties. The possessions of the Commandery of Any, or Knockany (now Hospital), County Limerick, as enumerated in the Lease thereof to William Apsley, in 1578, offers a good example of the nature and extent of the endowments of a preceptory of the Knights Hospitallers, as enjoyed about the period of the dissolution:

“Lease to William Apsley, Esquire, of the Commandery or Manor of Anee, County Limerick, and all its appurtenances in Anee, Ballenacloige, Lymrick, Kilmallock, Adare, Croghe, Askeinie, Rathkille, Ardagh, Casshell, Carrick, Ardartie, aud Dengen; also the rectories of Anee, Loinge, Kilfrusse, Kayreconey, Kairefussock, Killcallane, Moreton, Owlys, Browe, Carnowsie, Rochiston, Ardare, Gary-Uskan, Kilbaren, Meynarde, Kilwille, Killene, Killino, Killane, Kiltome, Rathronane, Aressynane, *alias* Ardfynan, Mortelleston, Cnockgraffin, and Carrintobber, in Counties Limerick, Kerry, Tipperary, and Clare, and all other possessions of the Commandery, parcel of the late Hospital of St. John of Jerusalem in Ireland.”

(Fiant Elizabeth, No. 3250. Appendix to Thirteenth Report of the Deputy Keeper of the Public Records in Ireland, pp. 68, 69. This Fiant has been printed by Miss Hickson in her admirable notice of “The Knights of St. John in Kerry and Limerick,” published in the Journal of the Royal Historical and Archæological Association of Ireland, 4th series, vol. ix., p. 184, *et seq.*)

document Clontarf is described as “a vill near Dublin called Clenmthorp.” This Charter, under which Crook, Kilbarry, and other possessions of the Templars were also held, was cited in the proceedings between the Abbot of Dunbrody and the Templars referred to at p. 287, *supra*, and is set out in Sweetman’s “Calendar of Documents” (1285–1292), p. 329. The Charter of Henry II was confirmed by a grant in Frankalmoigne, and Charter of Confirmation from Henry III, dated February 11, 1226–7 (Cal. S. P. Ireland, 1172–1251, p. 225). The Charter of Henry III was in turn confirmed by Charter of Edward I, dated November 22, 1280 (Cal. S. P. Ireland, 1252–1284, p. 368). On the suppression of the Templars, the Manor of Clontarf, appurtenant to the foundation, was granted in 1311 to Richard de Burgh, Earl of Ulster, but the Preceptory itself was transferred to the Hospitallers. It was sequestered in 1440, in consequence of the disloyalty of Thomas FitzGerald, then Prior of Kilmainham. It was probably restored to the Order, but if so it appears to have been resumed and to have remained in the Crown down to the dissolution of the monasteries, for an Inquisition of the year 1527 speaks of it as then suppressed. In 1541, as narrated above, it was granted to Sir John Rawson, the last Prior of Kilmainham. After the rebellion of 1641, the lands were confiscated, and granted to John Blackwell, through whom they passed to the Vernon family.

II. COUNTY CARLOW.

Killergy is situate on the river Slaney, some five miles from Carlow, and some remains still exist at Friarstown. Of this house, Ware states that it was founded for Knights Hospitallers by Gilbert de Borard in the reign of King John. Its name is preserved in that of the parish of Killerig, in the barony of Carlow. The precise date of the original grant is unknown; and I am unable to find any authority for the statement that it was a Templar foundation—an assertion which, perhaps, had its origin in a grant by Nicholas Taaffe to the Master of the Templars in 1284, of his lands near Killergy. It is not included in the list of Templar possessions in 1307. Archdall gives the names of several of its Preceptors. At the dissolution it was leased to Christopher Dowdall and others for twenty-one years at a rent of £4, subject to the payment of a pension of £24 5s. 7d. to the late Preceptor (Fiant Henry VIII, 222). Subsequently it was granted by Elizabeth to “Mary Travers, now wife of Gerald

Aylmer, Esq., and commonly called Viscountess of Baltinglass" in 1589 (Fiant Elizabeth 5386).¹

III. COUNTY CORK.

Mourne is situate three miles south of Mallow in the Barony of Barretts. According to Ware, "Alexander de Sancta Helena was either founder or first benefactor in the reign of King John." It was also known as Mora, or Ballynamona. Charles Smith, in his "History of Cork," incorrectly and without authority calls it a Commandery of the Templars. The castle, of which considerable remains still exist, appears to date from about 1335, as in that year the Prior of Kilmainham committed "the whole government and custody of our house at Mora" to Friar John Fitz-Richard, in consideration of his erecting a castle there within ten years. (King MS.) Mourne was leased at the dissolution to Dermot MacCormack-oge, its last Preceptor, at a rent of £9 (Fiant Henry VIII, 461). It was subsequently granted in 1577 to Cormac MacTeig MacCarthy (Fiant Elizabeth 3121); but his descendants forfeited it after the rebellion of 1641.²

IV. COUNTY DOWN.

Ards.—Now known as Castleboy, or Johnstown, situate in the Barony of Ards, three miles north of Portaferry. According to Ware this house was founded for the Knights Hospitallers by Hugh de Lacy. The names of some of the early Preceptors are given by Archdall in the agreement about the "Liber Hospes" in Winetavern Street,

¹ Ballymoon, near Bagenalstown, is another reputed Templar foundation in the County Carlow, as to which there is no direct evidence to authenticate the traditional account. It is not included in Ware's list.

² Rhincrew. A persistent tradition, for which, however, I can find no reliable documentary authority, ascribes the remains of a monastic foundation which occupy the summit of the promontory at the mouth of the Blackwater overlooking the town of Youghal, to a Templar origin. That excellent antiquary, the late Canon Hayman, in his "Annals of Youghal," adopts the tradition, to which Charles Smith, in his "History of Cork," and Crofton Croker, in "Researches in the South of Ireland," have given wide currency. Canon Hayman surmises that Rhincrew was founded by Raymond le Gros in 1183, but without assigning any authority. It is not included in any of the extant lists of Templar foundations. Rhincrew became part of Sir Walter Raleigh's large estates, and passed from him to the Earl of Cork.

Thomas de Stanwell, described as "Master of Ulster," probably represented this Preceptory. After the dissolution, the Preceptory of Ards was leased, in 1584, with the Manor of Johnstown and other lands, to George Alexander (Fiant Elizabeth, 4420).¹

V. COUNTY GALWAY.

Kinalekin is situate in the parish of Ballynakill, and Barony of Leitrim, about three and a-half miles from Woodford. Of this house Ware merely observes that it was a Preceptory of the Order of Knights Hospitallers; and he mentions a Friary of Minorites at the same place. Archdall says, on the authority of Alemand, that "a Commandery for Knights Hospitallers was founded here in the thirteenth century by O'Flaherty," and gives the names of three fourteenth-century Priors. Archdall, misled by the O'Flaherty origin, supposes Kinalekin to be in Iar-Connaught. But O'Donovan has shown its real situation to be in the Clanricarde country (Four Masters, p. 2230). His detailed description of the remains of the Preceptory will be found in the Ordnance Survey Papers for Co. Galway at the Royal Irish Academy, vol. ii. p. 504. In a power of attorney given by the last Prior of Kilmainham, printed in "Blake Family Records," first series, p. 67, mention is made of "the tithes of Kenaleghen, in the Diocese of Clonfert." At the dissolution Kinalekin was leased to Walter Hope (Fiant Elizabeth, 1639), and in 1578, "the rectory of Kynnaleighane, Co. Galway, with the tithes of Kynnaleighane and Barneboye, possessions of the late Hospital of St. John of Jerusalem in Ireland," were granted, *inter alia*, to the provost and burgesses of Athenry (Fiant Elizabeth, 3419).

VI. COUNTY KILDARE.

Ware enumerates Kilbegs, Kilheel, and Tully as "three Preceptories of Knights Hospitallers, whereof Kilheel was the donation of Maurice FitzGerald."

1. *Kilbegs* is situated in the Barony of Clane, four miles north-west of Naas. Its name is preserved in that of the parish of Killybegs, in the Diocese of Kildare. Archdall says: "The Knights Hospitallers had a Commandery here, of which we have no further account."

¹ For a note on the extent of the preceptory of Ards, see Bishop Reeves's "Ecclesiastical Antiquities of Down, Connor, and Dromore," p. 164.

2. *Kilheel*, now Killeel, is situate in the parish of Kill, and barony of Salt, about six miles from Naas, and close to the border of County Wicklow. Beyond the tradition of its foundation by Maurice FitzGerald in the thirteenth century, little is to be gleaned regarding it until close to the date of the dissolution of the monasteries. A patent of Henry VIII, cited in Cardinal Moran's edition of Archdall, gives the reason for this silence of the records. The Prior and brethren of Kilmainham, "in consideration that the Preceptory, lordship or manor of Kilheale, in Kildare county, is situated in the marches thereof, near the Irish enemies, the Tholes (O'Tooles), where resistance and defence are required, grant to Thomas Alan and Mary his wife, the said lordship." After the dissolution this grant was confirmed by Henry VIII by patent dated 12th June, 1543; and the same was further sanctioned by Elizabeth in 1566 (Morrin's Calendar of Patent Rolls).

3. *Tully*.—This house was situate one mile south of Kildare. There is no record of the date of the original grant to the Hospitallers. It is evident, however, that the foundation was an important one, since numerous chapters of the Hospitallers were held here between the years 1326 and 1349. The names of many of the Preceptors of this house have been preserved, and are given by Archdall. After the dissolution Tully was leased in 1569 to Sir William Sarsfield, and was subsequently granted, 1584, to Sir Henry Harrington (Fiants Elizabeth, 1407 and 3710). It afterwards became the property of the Sarsfield family, and the famous Patrick Sarsfield is said to have lived there. Ultimately Tully was held *in commendam* with the bishopric of Kildare.

VII. COUNTY LIMERICK.

Any is situate in the barony of Small County, about two miles from Emly, and four from Bruff. According to Ware it was "founded for Knights of the Hospital in the reign of King John by Geoffrey de Marisco." After the dissolution it was leased with its appurtenances, which were chiefly in Kerry, to William Apsley. On the suicide of Apsley's son and heir, Edward, his estate was granted "to Thomas Brown, gent., and Mary his wife, sister of Edward Apsley; and Richard Boyle, gent., and Joan his wife, the other sister of the said Edward Apsley" (Fiant Elizabeth, 6002). The interests of these co-heiresses were united on the marriage of the heir of Sir Thomas Brown with Barbara, niece of Richard Boyle, the great Earl of Cork;

and the Hospital or Commandery of Any has since remained in the Kenmare family. (See the "Lismore Papers," first series, vol. ii., p. 236).¹

VIII. COUNTY LOUTH.

T. *Kilsaran* is situate in the barony of Ardee, close to Castlebellingham. According to Ware, "this seat first belonged to the Knights Templars, by donation of Maud de Lacy, but was afterwards given to the Knights of the Hospital in the reign of Edward II." Maud de Lacy seems also to have presented the Order with the advowson of the Church of Carlingford. In 1438, Marmaduke Lomley, whose misfortunes have been mentioned above, was appointed its Preceptor. Prior to the dissolution it appears to have been leased by the Priors of Kilmainham to Sir Oliver Plunkett, and in 1570 a lease was given to Sir Thomas Plunkett, Lord of Louth (Fiant Elizabeth, 1483), from whom Kilsaran appears to have passed to the Bellew family.²

IX. COUNTY MEATH.

1. *Kilmainham-beg* is situate in the barony of Lower Kells, twelve miles from Navan. According to Ware, it was "founded by Walter de Lacy, Lord of Meath, in the reign of Richard I, for the Knights Hospitallers." This house appears to have been leased before the dissolution to John Barnewall, Lord Trimleston, and another, for sixty years; and in 1585 Sir Patrick Barnewall, on surrendering this lease, received a new one from the Crown for sixty-one years. An Inquisition of 21st James I shows that Sir Patrick had subsequently acquired the fee.

2. *Kilmainham Wood*, also situate in the barony of Lower Kells, some three miles from Nobber, is described by Ware simply as

¹ Most of the Plantagenet and Tudor grants relating to their preceptory and its possessions have been referred to by Mr. T. J. Westropp, M.R.I.A., in his "Ancient Castles of the County Limerick," at p. 182 of this volume.

² The Templars were also possessed of the Manor of Cooley, or Cowley, now Templetown, situate some five miles from Carlingford, in the barony of Lower Dundalk. The place was of considerable importance, and in a Certificate dated 1st Edward I, it appears to have ranked as the wealthiest manor of the Templars, to whom it was granted by Matilda de Lacy. That the manor passed to the Hospitallers appears both by the Inquisition taken in Elizabeth's time, which recites a demise by Prior Rawson to Oliver Plunket of the "Lordship of Templetown in Cowley," and by the Inquisition of 34 Hen. VIII, which mentions "an ancient castle and 120 acres of arable land in Templeton." But, though evidently an important station, there is no reason for believing that it ever held the rank of a commandery or preceptory under either Order.

“a preceptory of Knights of the Hospital.” After the dissolution it was leased for ever, in 1575, to Callough O’More (Fiant Elizabeth, 2606), in consideration of the good service of Rory O’More and his son, Callough, to Edward VI.

X. COUNTY ROSCOMMON.

Randon or Teacon.—St. John’s, Randon, situate on a promontory on the western shores of Lough Ree, about half-way between Athlone and Lanesborough, was founded, according to Ware, “for the Knights of the Hospital, in the reign of King John, and, as some say, by his command.” In the reign of Henry III this house received important benefactions from Philip Nangle. The Castle at Randon, which appears to have been built in 1275,¹ was long an important fortress in the west of Ireland, and after the dissolution was maintained as such until 1600, when it was granted to the Povey family. The Preceptory of Randon was leased in 1569 to Christopher Davers (Fiant Elizabeth, 1483). In “Ireland and the Anglo-Norman Church” will be found an account of the remains at Randon, which Dr. Stokes considered “well worth investigation, as showing more completely than any others in Ireland the plan of a Preceptory of the Hospitallers” (p. 246).

XI. COUNTY SLIGO.

T. Teach-Temple, now Templehouse, is situate in the barony of Legny, about three miles from Ballymote. According to Ware, “the Knights Templars seated themselves here in the reign of Henry III.” Archdall gives the date of the foundation as between 1216 and 1271, when the Castle was taken and destroyed by Hugh O’Connor. It is not mentioned in the list of possessions in 1307, printed by Dr. Caulfeild; but it is included in the certificate of 1326, cited by Mr. Hore,² under the name of “Laghnehely in Connaught,” and is

¹ Sweetman’s “Calendar” (1252-1284), p. 235.

² “1326. Certificate of this date, with letter from the King to the Barons, dated 5th December, 19th year, respecting the value of the possessions of the Knights Templars in Ireland, viz.:—

Goods and Chattels at

Manor of Kylsarran, £53 6s. 11d.; Le Coly, £39 3s. 8d.; Loghnehely in Connaught, 73s. 8d.; Kylelogan, £140 13s. 0½d.; Le Crook, £32 8s. 4d.; Kylbarry, £56 6s. 0d.; Clontarf, £8 5s. 2d.; Clonnaul, £161 17s. 9d.; Rathronan and Akyltan, £35 1s. 7d.; Balgaveran, £25 16s. 13d.; Kylcorke and Rathbride,

mentioned in the "Annals of Lough Cé." According to Col. Wood-Martin, in his "History of Sligo," p. 286, no mention is made of Templehouse between 1271 and 1559, when it was plundered by Roderick MacDermot, of Moylurg. But it had certainly been held during the greater part of this long interval by the Hospitallers. After the dissolution Teach-Temple was leased first, 1569, to Christopher Davers and Charles Egingham; later, in 1578, to Thomas Chester and Charles Goodman; and again, in 1596, to William Taaffe (Fiants Elizabeth, 1483, 3241, and 6016).

XII. COUNTY TIPPERARY.

T. *Clonaul*, now Clonoulty, situated in the barony of Kilnamanagh, about midway between Tipperary and Thurles, and some six miles from Cashel, is simply described by Ware as "first the seat of the Templars, afterward of the Hospitallers." It is not mentioned in the list of the Templars' possessions in 1307, already referred to. But in the certificate of their goods and chattels, cited above, it is enumerated among other Templar foundations. After the dissolution "the Commandery of Clonhall, *alias* Clonnell, in the Diocese of Casshel," was leased for forty years from 1575 to Jasper Horsey. But in 1596, a fresh lease was made of the Preceptory to Richard Harding (Fiants Elizabeth, 2406 and 5988).

XIII. COUNTY WATERFORD.

T. 1. *Crook* is situate in the Barony of Gaultier, about six miles from Waterford, a little below Passage. It was granted by the Charter of Henry II, cited under Clontarf, and confirmed by the other Charters there referred to, "with ten carucates of land." The Preceptory of Crook was leased with that of Killure, in 1578, to Robert Woodford, and in 1584, to Anthony Power (Fiants Elizabeth 3227 and 4529).

£32" (Mag. Rot. Scac. Hib., 19 Edwd. II, No. 541-7, P.R.O.L.). Hore's "History of Wexford," iv., p. 281.

Of the places above enumerated, Le Coly, in Louth, Rathronan and Akyltan, in Tipperary; Ballygaveran (the modern Gowran, in Co. Kilkenny); Kylcorke and Kilbride, in Kildare, do not appear to have been preceptories or commanderies even in Templar times. If they were such, they belong to the class of possessions which were diverted to lay ownership after the suppression of the Orders, as only the rectories of these parishes seem to have become the property of the Hospitallers.

Later the Castle and demesnes were granted to Sir John Davis, by whom they were assigned to Richard Aylworth (Smith's "History of Waterford," p. 103).

T. 2. *Kilbarry* was granted to the Templars by the Charter of Henry II already cited, where it is described as "the vill near Waterford whose church is dedicated to St. Barry." Kilbarry is situate about one mile from Waterford, and within the ancient Liberties of the City, on the road to Tramore. Possibly the marsh which adjoins it is the "small marsh between the King's houses and the sea, near Waterford," mentioned in Henry II's Charter. According to Archdall, the manors of Kilbarry, Crook, and Kilelogan were assigned in 1311 to the support of the destitute dispossessed Templars throughout Ireland; but they ultimately passed to the Hospitallers ("Monasticon Hibernicum," p. 228). Kilbarry was granted at the dissolution to Thomas, tenth Earl of Ormond, in fee-farm, and by him assigned to Thomas Wadding (Smith's "History of Waterford," pp. 99, 100; and see Fiant Elizabeth, 2592).

3. Killure is situate in the Barony of Gualtier, three miles from Waterford. According to Ware, it belonged, like Crook and Kilbarry, "first to the Templars and after to the Hospitallers." But I can find no evidence of any Templar foundation. Killure is certainly not included in the Grant of Henry II to which that Order owed the two latter commanderies; nor is it mentioned either in the list of Templar possessions in 1307, or in the certificate of 1326. But even more conclusive than this negative evidence is the record of a suit heard at Waterford, in the year 1300, in which "Brother Hughes, Preceptor of the House of Killeur, Attorney of the Priory of St. John of Jerusalem in Ireland, was plaintiff" (Calendar of Justiciary Rolls of Ireland, p. 300). After the dissolution it was leased in 1578 with Crook to Robert Woodford, and in 1583 to Nicholas Aylmer (Fiants Elizabeth, 3227 and 4159). According to Charles Smith ("History of Waterford," p. 104), it was subsequently granted to Francis Felton, by whom it was assigned to Laurence, Lord Esmonde.

XIV. COUNTY WEXFORD.

T 1. *Kilclogan*, now known as Templetown, is situate in the Barony of Shelburne, about two miles from Fethard, and two miles from the outer entrance to Waterford Harbour. The precise origin of this foundation cannot be traced. The grants to the Templars in Henry II's Charter, which speaks of "the Church of St. Alloch

(or Walloch), near Wexford, and Adgmile, a Burgess of Wexford with all his Chattels," cannot be supposed to refer to Kilelogan. The grant of Kilelogan to the Templars, who were unquestionably in possession of it at the date of their suppression, has been generally ascribed to Conogher O'Morras (*sic*), of Leix, a twelfth-century chief. If this be so, it is the only Templar foundation derived from Irish as distinguished from Anglo-Norman patronage. Ware merely states that Kilelogan was "the habitation of the Knights Templars in the reign of King John." Mr. Hore in his "History of the Town and County of Wexford," vol. iv., where many facts concerning the Templars in Ireland are collected, discusses the probabilities as to this grant, but without adducing any conclusive evidence (pp. 262-4). At the dissolution, Kilelogan was leased, with the Hospitallers' house in Wexford, to James Sherlock of Waterford, at a rent of £26 13s. 4d. (Fiant Henry VIII). It was subsequently leased to Sir Thomas Radcliff, afterwards Earl of Sussex, and after being held by Sir Henry Harrington was ultimately acquired by Sir Dudley Loftus, in whose family it has since remained (Fiants Elizabeth, 2697 and 5080).¹

2. *Wexford*.—The Priory of St. John and St. Bridget, in the town of Wexford, was founded, as stated by Ware, "by William Mareschall, Earl of Pembroke, for Knights of the Hospital." Archdall states that previous to the abolition of the Templars this was the principal house of the Hospitallers in Ireland. There is no authority for this statement, though it is probable enough that a house founded by the Earl of Pembroke was always one of considerable consequence. This priory was leased in 1575, with Kilelogan and other possessions of the Hospitallers, to Sir Thomas Radcliff, afterwards Earl of Sussex, and subsequently, in 1557, to Sir Henry Harrington (Fiants Elizabeth, 2697 and 5080). Later it became with Kilelogan the property of Sir Dudley Loftus (Hore's "History of Wexford," vol. iv., p. 294).

¹ Ballyhack, also in the Barony of Shelburne, and one mile from Duncannon, appears to have been dependent on Kilelogan, and hence it has been deemed by some writers to have been a Templar establishment. There is, however, no sufficient warrant for this assumption. There is no record of its founder, or the date of its foundation, and the appearance of the name of the "Master of Ballycanok," in a list of witnesses to a 13th-century Charter, in company with the heads of several unquestionably Hospitallers' houses, seems to show that it was originally associated with the Hospital of St. John. Very possibly on the acquisition of Kilelogan by the latter, it was thought convenient to affiliate the smaller foundation of Ballyhack to the more important house of Kilelogan.

APPENDIX II.

A SUCCESSION OF THE PRIORS OF KILMAINHAM.¹

1180 Hugh Clahul or Cloghall.	1348 John Tylloch.
1194 David.	1350 John FitzRichard.
1201 Maurice de Prendergast.	1356 John le Frowyk.
1220 William de Evoyaes.	*1359 Thomas de Burley.
1231 John de Callan.	1371 William Tany.
1248 Nicholas de St. Edward.	*1379 Peter Holt.
1260 Henry Kyriell.	1386 Richard White.
1270 Philip.	1400 Robert White.
1274 William de Bures.	*1403 Thomas le Botiller.
1274 William FitzRoger.	*1415 William FitzThomas
1292 Thomas de Hackwell.	(probably <i>locum tenens</i>
1293 David de Castel.	for Prior Butler).
1296 William de Rosse.	1418 Thomas le Botiller.
1298 Gilbert de Haghham.	1419 John FitzHenry.
1301 Walter de Euias.	1438 Thomas FitzGerald.
1302 William de Rosse (<i>locum</i>	*1446 Thomas Talbot, deprived
<i>tenens</i>).	for maladministration,
1303 Richard de Kerbi.	1449; but restored by
1307 Walter del Ewe, or de	bull of the Grand Master,
Euias.	in 1454. Again deprived
1311 Roger Utlough.	for maladministration, in
1340 John Marischal.	1459.
*1341 John le Archer.	*1450 Thomas FitzGerald.

¹ The succession of the Priors here presented, which is of course necessarily imperfect, is based primarily upon the King MSS. in the Harris Collection at the National Library. This is the source chiefly relied on by Archdall and D'Alton in their enumeration of the Priors; and it may be added that as often as they depart from it these writers fall into error, for the authority of Robert Ware is not high. The authority for the names and dates in the King MSS. is not in all cases forthcoming, many of the sources cited having been destroyed, subsequent to the compilation of the list, in the great fire at Dublin Castle in 1711. But arguing from the accuracy of the statements in the MSS. still capable of verification, they may be taken as correct. The names in this succession not given by King have been derived from records since made available: e.g., the Chartulary of St. Mary's Abbey, the Calendar of Christ Church Deeds; the *Dignitas Decani* of St. Patrick's, and the State Paper Calendars. Those names to which an asterisk is prefixed were also Priors of Ireland.

- | | |
|-------------------------------|--------------------------------|
| 1456 Thomas Talbot. | *1511 John Rawson. Resigned |
| *1461 James Keating, deprived | his Priory of Ireland, |
| for disobedience, by bull | 1527, on being appointed |
| of the Grand Master of | Turcopolier. Again ap- |
| the Rhodes, 1482. | pointed, 1527. |
| 1482 Marmaduke Lomley. | 1541 Prior Rawson surrendered. |
| 1495 John Vale. | 1557 Oswald Massingberd, on |
| 1496 R. Talbot. | the restoration of the |
| *1500 Robert Evers or Ewre, | Hospital under Mary. |
| deprived in 1511. | |

[The authorities on which this paper is based are, for the most part, indicated either in the foot-notes or in the body of the text. But I have derived much assistance from some unpublished sources, notably from the MSS. collections of the well-known antiquary William Monck Mason, the author of the "History of St. Patrick's," which are preserved among the Egerton MSS. in the British Museum, and which include a very valuable annotated copy of Archdall's "Monasticon Hibernicum." Considerable use has also been made of the unpublished Irish Statutes at the Irish Record Office, and of the Ordnance Survey Papers in the Academy's possession. My manifold obligations to Rev. Edmund Hogan, S.J., F.R.U.I., are apparent from the notes to the first section of this paper. In my references to the Templars, and in dealing with that part of the Hospitallers' possessions which was derived from the Templars, I have been very greatly assisted by my friend Mr. Herbert Wood of the Irish Record Office. I am glad to know that the results of Mr. Wood's close investigation of the obscure story of the Templars in Ireland are likely to be shortly available.—C. L. F.]

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XIII.

STONE CHALICES, SO CALLED.

BY E. C. R. ARMSTRONG.

PLATE XXI.

Read FEBRUARY 11. Ordered for Publication FEBRUARY 13.

Published MARCH 30, 1907.

ON page 132 of Sir William Wilde's catalogue of the Stone Antiquities in the Museum of the Royal Irish Academy is found the following statement:—"Among the stone ecclesiastical antiquities may be classed a vessel, supposed to be a chalice." An illustration of this vessel is given on the same page.

This statement is also made in W. F. Wakeman's "Handbook of Irish Antiquities," both in the early 1848 edition, and in the third edition edited by Mr. John Cooke, where it will be found on page 356. Again, Miss M. Stokes describes this same vessel as a chalice in her "Early Christian Art in Ireland," page 69. The first doubt raised as to this statement is in a paper printed in the Journal of the Waterford Archæological Society for the third quarter of 1906, written by the Rev. P. Power, on "Four or Five Stone Chalices from Early Church Sites in the Decies."

Father Power mentions in his paper a conversation he had with Mr. Coffey, of the National Museum, in which the latter gave as his opinion that stone vessels of this kind, generally called chalices, were not in fact chalices at all, but lamps, and, when found on church sites, probably used for ecclesiastical purposes.

Father Power, arguing from the weight of one of the objects he was describing in his paper, has come to the conclusion that these objects are not chalices.

Being interested in the matter, I spoke to Mr. Coffey about Father Power's paper; and he told me he thought the subject was capable of

elaboration, and that there was room for a paper dealing more fully with the matter.

In this paper I attempt, by bringing together such materials as I can collect concerning the chalices used by the early Church, to show the extreme unlikelihood of these stone vessels having been originally intended for chalices, and at the same time, by comparing them with stone lamps used in other countries, both in former times and to-day, to point out the similarities between them and the probability that our Irish stone vessels were intended for the same purpose. There are five of these stone vessels in the collection of the Royal Irish Academy in the National Museum, which Mr. Coffey has kindly allowed me to have drawn and to make use of for the purposes of my paper. To deal first with the materials from which chalices were made in the early days of the Church, there is the legend in the "Tripartite Life of St. Patrick" that the saint gave his servant four glass chalices.

Chalices of glass were in common use on the Continent up to the ninth century, though after that period they gradually fell into disuse.¹ There is a fine glass chalice preserved in the Vatican Museum, supposed to be of the third or fourth century; it is figured by le Chanoine Reusens in his "Manuel d'Archéologie Chrétienne," p. 105; on the same page he also figures two other glass chalices which he describes as "deux calices anciens, également de verre, et remontant à la même époque."

In England there is a glass cup preserved by the Musgraves at Edenhall, Cumberland, which is known as the "Luck of Edenhall," and has been called a chalice.

There are some ecclesiastical decrees on the subject of the materials from which chalices were to be made. Gratian, in his "Collection of Decrees,"² quotes two decrees. The first is that of the Concilium Triburiense, held in Germany in the year 895. The object of this decree was to condemn the use of wooden chalices; and at the same time it seems to object to the use of vessels other than gold or silver, since it quotes an alleged decree of Urban II., ordering all vessels to be of either gold or silver. The decree runs as follows:—
"Vasa, quibus sacrosancta conficiuntur misteria, calices sunt et

¹ Tertullian: Cyprianus Gallus: Addis and Arnold, Catholic Dictionary, 1893, p. 153.

² Corpus Juris Canonici, Editio Lipsiensis secunda Decretum Magistri Gratiani. Pars Prior, p. 1306. Decreti Tertia Pars de Consecratione Dist. I. c. XLIV.

patenae, de quibus Bonifatius martir et episcopus interrogatus, si liceret in uasculis ligneis sacramenta conficere, respondit: Quondam sacerdotes non aureis sed ligneis calicibus utebantur. Zepherinus, xvi. Romanus episcopus, patenis uitreis missas celebrare constituit. Deinde Urbanus x Papa omnia misteria sacra fecit argentea. In hoc enim, sicut et in reliquis cultibus, magis et magis per incrementum temporum decus succreuit ecclesiarum. Nostris enim diebus, qui serui patrisfamilias sumus, ne decus matris ecclesiae minuat, sed magis cumuletur et amplificetur, statuimus, ut deinceps nullus sacerdos sacrum misterium corporis et sanguinis Domini nostri Iesu Christi in ligneis uasculis ullo modo conficere presumat, ne, unde placari debet, inde irascatur Deus."

The 1582 edition, Rome, has a gloss:—"Quaesitum fuit in Concilio Triburien utrum in ligneis vasis deberet confici Corpus Christi et dictum fuit in Concilio quod Bonifacius Papa de hoc interrogatus respondet quod non. Cum enim ita factum fuerit in primitiva Ecclesia, Zepherinus constituit ut fieret consecratio in vitreis. Urbanus postea vasa sacra argentea fecit: et concilium statuit ut nullus conficiat in ligneis vasis de cetero, ne honor Ecclesiae suo tempore minuat."

The gloss seems to say Zepherinus ordered the vessels to be of glass, though the decree only mentions patens.

The second decree quoted by Gratian is that of a Council of Rheims.

The part referring to chalices is given thus:—

"Ut calix Domini cum patena, si non ex auro omnino ex argento fiat. 1. Si quis autem tam pauper est, saltem uel stagneum calicem habeat. 2. De ere autem aut ex auricalco non fiat, quia ob uini uirtutem eruginem pariterque uomitum prouocat. 3. Nullus autem in ligneo aut in uitreo calice presumat missam cantare."

A gloss in the edition cited above gives the reason why certain materials in the sacred vessels were condemned:—

Wooden chalices were condemned—"Quia lignum porosum est," and hence might absorb part of the precious blood.

Glass were condemned—"Quia vitrum fragile est et immineret periculum effusionis." Because glass is fragile, and there is always danger of spilling.

Bronze and copper were condemned—"De aere autem vel aurichalco nullo modo fiant; quia solent aeruginem colligere et uomitum provocare." Because they are wont to collect rust and provoke vomiting.

There was a British Council, called the Council of Chalceuth, in the reign of Egbert, 785 A.D., which forbade chalices of horn—"Quod de sanguine sunt."¹

As a rule, chalices might not be made of materials containing blood, such as horn, absorbent materials like stone or wood, or metals which might affect the wine. Crystal seems to have been allowed.

The only stone chalice of which there is any record is the chalice of St. Edward the Confessor, used at the coronation of the English Kings. The cup of this chalice appears, however, to have been of agate, which is akin to crystal, and non-absorbent. Even in this case it is not clear that this chalice was used for the consecration of the Eucharist; for in a marginal note to one of the coronation orders of the fifteenth century, it is said that the Archbishop did not celebrate Mass with it, but with a chalice of gold.² Communion in two kinds was not abolished until the thirteenth century; and before the abolition two chalices were commonly used: one, called the ordinary chalice, was small; the other, called a minstrel chalice, was larger, generally with two handles, and was used in giving the cup to the laity.³ Therefore, in the times we are speaking of, the weight of a chalice would be of some importance.

Now to turn to the objects themselves. Plate XXI., fig. 1, is the vessel described by Sir William Wilde as a chalice, and referred to at the commencement of this paper. It is made of sandstone, and is $7\frac{1}{4}$ inches high, $4\frac{3}{4}$ inches in diameter at the top, stands on a base $3\frac{2}{3}$ inches long, and weighs 3 lb. $12\frac{1}{2}$ oz. It was found on the lands of Humphreystown, Talbotstown, Co. Wicklow. The shaft is carved with a Romanesque rope-like ornament.

The architecture and mouldings of this vessel are of a Romanesque type, which cannot have been in Ireland before, say, the tenth century; that is, considerably later than the decree forbidding chalices to be made of wood—sandstone being, like wood, a very absorbent material. I would also point out that the advanced architectural character of the vessel presumes that more precious materials were in use, and that stone would not have been carved for such purposes at that time. Moreover, this vessel was not found in a primitive part of the country, but in the east of the country, on the borders of Kildare, where the organization of the Church was well established at the time indicated by the ornament. Compare fig. 1 with fig. 2, plate.

¹ Wilkins, *Ancient Laws and Institutions*, vol. i., p. 147.

² Wickham Legg, *Coronation Records*.

³ Le Chanoine Reusens, *Manuel d'Archéologie Chrétienne*, pp. 105 and 106.

Fig. 2 is taken from "The Mycenæan Age," by Messrs. Tsountas & Manatt, who, on pages 79 and 80 of their book, describe it as a *stone lamp*. They say:—"We are now in a position [1895] to maintain that the Mycenæans were not strangers to lamp-light, and that we have actually found lamps in their chamber-tombs. Then follows a description of a flat, ornamented stone lamp, with a note that other like vessels have been found, all very shallow, and three of them are mounted on a standard some 20 inches high. One of these last is fig. 2 of our plate.

The argument is then summed up:—"The general form, the shallowness of the bowl, the number of mouths, the height of the standard, and the peculiar handles, go to show they were neither ordinary receptacles nor torch-holders. We take them for lamps, in which oil or fat, more probably the latter, was burnt, thus affording a steadier and safer light than the fitful fire or the flickering torch."

The number of mouths must refer to the other lamps mentioned, as there are no mouths shown in the illustration of the lamp mounted on the standard.

Again, in Plate XXI., compare fig. 1 with fig. 3. Fig. 3 represents an altar candlestick of stone, figured in the "Ulster Journal of Archæology," vol. vii., p. 72. It was discovered inside the ancient Cathedral of Armagh; the date of this object is supposed to be the twelfth or thirteenth century, from the style of ornament.

Its height is $8\frac{1}{2}$ inches, and diameter at top $3\frac{1}{4}$ inches.

Surely, the same idea is present here; and the maker of this stone candlestick had the stone lamp, formerly used, in his mind.

The next illustration on the plate, fig. 4, is $6\frac{1}{2}$ inches high, 4 inches in diameter at the top, and has a small cavity, not quite an inch deep, at the top end. It has a small cover, which has been called a *paten*, fig. 4B. This vessel comes from the Blasket Islands. Miss M. Stokes mentions it in her "Early Christian Art in Ireland," p. 69, as follows:—"One example [of a chalice], now preserved in the Museum of the Royal Irish Academy, is as rude and archaic as the primitive cell in the monastery on the Blasket Islands, from which it was taken." In this connexion, I would point out that the fact of this vessel being taken from the Blasket Island monastery cell does not help towards the chalice theory; for though every hermit was not of necessity a priest, and therefore able to use a chalice, probably most hermits would have a lamp. It must also be remembered that on the rude open-air altars erected on the west coast for stations, it is the custom to place any remarkable stone found in the locality, and

attach some virtue to it. The name of chalice might easily be given to a vessel of this shape, and so a tradition would be created, such as happened in the case of the stone vessel called St. Columba's chalice, on Tory Island, and described by Father Power in his paper, page 144.

An examination of this object, fig. 4, reveals two points to be noticed—(1) the bottom of the vessel is so uneven, that it will hardly stand by itself, leaning much on one side when it does; (2) that one side as shown in fig. 4A is flattened, no doubt for the purpose of fixing it against the wall.

The so-called paten, if originally belonging to this vessel, is evidently a cover used as an extinguisher, and as a protection to husband the oil or fat when the lamp was not in use. It is made of very hard stone, and may have been used as a lamp itself, as it fits, if reversed, into the top of the large vessel, and could have been used as the actual receptacle for the oil or fat. Compare the large vessel, fig. 4, with fig. 1 in the text, which is a drawing of a stone lamp brought back from the Hawaiian Islands by Sir Thomas Grattan Esmonde. Observe that in this lamp, which is $3\frac{1}{2}$ inches high, and $3\frac{1}{8}$ inches in diameter, there is the same kind of shape, and the same concave cavity, in this case about $1\frac{1}{8}$ inch deep. The similarity is very striking.

My next illustration, Plate XXI., fig. 6, is also in the Academy collection in the Museum (Petrie Collection). It is 7 inches high, $5\frac{1}{2}$ inches in diameter at one end, and $4\frac{1}{2}$ inches at the other. It is hollowed out at each end, and is shaped like a dice-box. It has a slight ornamentation at each end and in the centre. It weighs 7 lb. $3\frac{1}{2}$ ounces. It was found in 1848 in sinking the foundation of a well adjoining the ancient church of Ardmulchon, Co. Meath. The weight of this vessel, though excellent from the point of view of the steadiness necessary in a lamp, must have been, to say the least of it, very inconvenient in a chalice. It should be compared with fig. 2 in the text, which is a drawing of a similar vessel, dug up some years ago on Sir Thomas Grattan Esmonde's demesne at Ballynastragh, Gorey, County Wexford.

This vessel, which Sir Thomas Esmonde kindly lent me for examination, is similar in shape, and has the same concave cavity at each end. It is $6\frac{1}{2}$ inches high, with a diameter at each end of $5\frac{1}{2}$ inches. The cavity at one end is $\frac{7}{8}$ of an inch, and $\frac{3}{4}$ of an inch at the other. Sir Thomas calls his stone vessel an Irish stone lamp; and I almost think, without being too rash, we may consider fig. 6 as having been originally intended for a stone lamp.

The next object (Plate XXI., fig. 8) is the vessel discovered by Mr. R. J. Ussher, in the Newhall cave, County Clare, which is mentioned by Father Power in his paper as somewhat resembling the St. Columba chalice of Tory Island. This vessel is $2\frac{7}{8}$ inches high, $5\frac{1}{2}$ inches in diameter at the top, and has a cavity at the top $1\frac{1}{2}$ inch deep, while on the under side, as shown in fig. 8A, there is a small cavity about 1 inch deep. This vessel still retains the deposit of soot within the cup which it had upon it when Mr. Ussher discovered it. It has a plain ornament of a band round its centre. The inference of the charcoal is obvious, and the small cavity on the under side may have been used to fix the lamp on a stick to raise the light.

Fig. 9 of the plate, also in the Museum, is quite plain; it is $3\frac{1}{4}$ inches high, $3\frac{3}{4}$ inches in diameter, and has only one cavity at the top, 1 inch in depth. It weighs 3 lb. $3\frac{1}{2}$ oz., and was found at Dowth, in the late passage and chambers of which pins of the Danish period were found; so that it probably had no connexion with the original use of the tumulus.

Therefore, no very early date or extraordinary use can be assumed for our stone vessel on account of its "provenance." Compare it with Plate XXI., fig. 10, which is an illustration of a worked stone lamp from the Kadiak Island, figured in the "Lamp of the Eskimo," by Walter P. Hough, plate xx, fig. 1. This paper is printed in the Journal of the Smithsonian Institution of 1898.

The general similarity between the two objects may, perhaps, help us to the idea that both vessels were intended for the same purpose.

As a note, by way of conclusion, I would like to point out that the worked stone lamp has played an important part in the history of artificial lighting, as the vessel of transition between the torch and the lamp of the inventive and modern type.

After the stone lamp comes the terra-cotta saucer, and the closed-in Roman pottery or bronze lamps. Then comes the old-fashioned brass lamp or cruse, mounted on a standard, with a kind of protruding spout and drip-dish; and after it other forms of metal lamps from which the modern lamp is directly derived.

Moreover, at the present time a great part of mankind still use the stone or pottery saucer-lamp. And I may also mention the scallop-shells used as lamps in the Aran Islands; the stone lamp among the Eskimos, South Sea Islanders, and the Indians of the North-west of Canada; while the pottery saucer-lamp is used in China and India.

NOTE ADDED IN PRESS.

After my paper was finished, and while going to press, I had the advantage of handling Sir Thomas Grattan Esmonde's two lamps, and having proper drawings made of them.

I take the opportunity afforded by this note of adding an illustration, fig. 3 below, of another stone vessel, also in the collection of the Royal Irish Academy, which I found after my paper had been read. It is hollowed out at each end, like fig. 6, in Plate XXI., and is important, as it shows the continuation of the same type of vessel as figs. 4 and 6, plate. Its measurements are $2\frac{5}{8}$ inches high, 5 inches in diameter at one end and $3\frac{1}{2}$ at the other. The cavity at the larger end is $1\frac{1}{8}$ inch deep, and at the narrower end is $\frac{1}{8}$ inch.

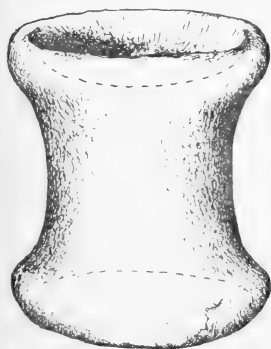


Fig. 2.

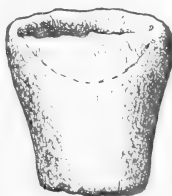


Fig. 1.

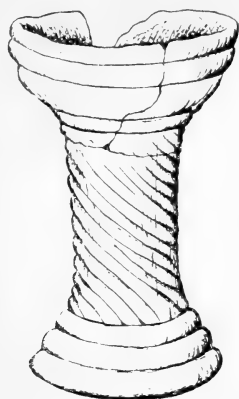


Fig 3.

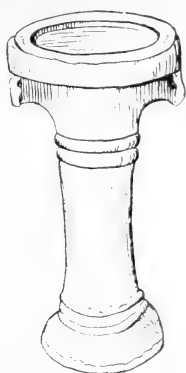
This vessel displays distinct traces of burning and blackening. I would also like to meet a possible objection that the other vessels described, with the exception of fig. 8 of the plate, do not retain traces of soot. Most of these vessels have been buried in the earth for over a thousand years, and exposed to weather. Even, however, allowing for this, and the cleaning and neglect they have met with

in private collections and the Museum, most of those objects will, I believe, on examination be admitted to show some traces of blackening and burning on the edge of the cup.

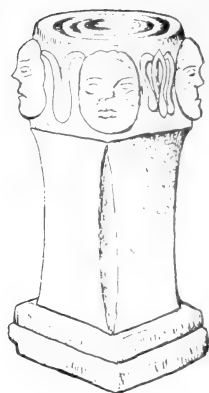
Although the marks of use are not so strong as on the two figs. referred to above, they are quite as distinct as those on Sir Thomas Grattan Esmonde's lamp from the Hawaiian Islands, which vessel, he told me, he himself saw in use there.



1



2



3



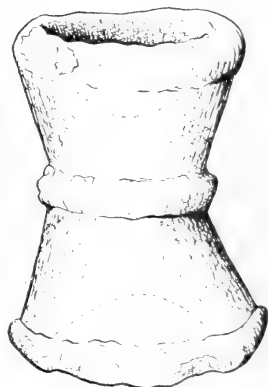
4



4A



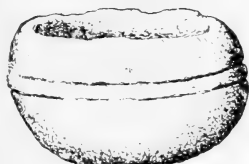
4B



6



9



8



8A



10

ARMSTRONG—So-called Stone Chalices.



XIV.

THE TEMPLARS IN IRELAND.

BY HERBERT WOOD, B.A. OXON.

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THE history of the Crusaders, and more especially of the chivalry of the Knights of the Temple, has for hundreds of years formed an attractive study to the historian and romance-writer, while the recent issue of several works on the latter subject has not only brought new facts to light, but has proved that the matter is still one of absorbing interest. When investigating the subject lately, I was struck with the very meagre details which are to be found, in the bibliography of the Templars, about the history of the Order in Ireland. There are a few references in the Irish histories and annals, though even these often depend for their authority on mere tradition. But such printed information as is to be found on the subject is so chaotic, conflicting, and unreliable, that I soon found it would be necessary to go back to contemporary authorities if any clear account of the possessions of the Order were to be obtained. That so little should be definitely known on the subject is not to be wondered at when we remember that, soon after the suppression of the Templars, the absence of orderly government and the long-continued civil strife destroyed in a great degree that historical continuity which we find in more favoured countries. Then, too, the fact that most of the Templars' possessions were handed over to the Hospitallers produced such confusion in people's minds that lands seem to have been attributed to one or the other Order as fancy prompted. It would almost appear as if a castle or ruin which really belonged to the Hospitallers received an added dignity by being attributed to the Templars. Tradition, too, though often "lying tradition," has been a further important factor in the case. But the ignorance of the difference between the two Orders, and the difficulty of getting at authoritative records, have been quite sufficient alone to produce the confusion. The same state of affairs is also to be found in Scotland. England, however, has been more fortunate, as the preservation of inquisitions and inventories of the Templars'

lands and goods, together with the report of the Prior of the Hospitallers in England in 1327 (Camden Series), in which he sets out the lands of the late Order which had come into his possession, will render the historian's task comparatively easy whenever an exhaustive account of the Templars' lands there comes to be written.

The late Bishop Reeves, as early as 1857, had formed the intention of investigating the subject, but he left it incomplete. It was probably with this idea that he copied out, or obtained a copy of, the Certificate and Receipts sent by the Irish Exchequer to England, 1 Edward III, at the King's desire to be carefully informed of what goods and possessions the Templars had in Ireland on their suppression. This copy will be found amongst the Trinity College Manuscripts (No. 1061). However, the Certificate and Receipts do not give a full account of the lands, as the Treasurer and Barons of the Irish Exchequer acknowledged that the state of the country prevented an accurate list being made. I have accordingly been obliged to try to supplement these facts from other sources, such as the Patent and Plea Rolls, and the Pipe and Memoranda Rolls of the Irish Exchequer, which contain valuable information as to the history of the Order, though the satisfaction afforded by such material is somewhat marred by the conviction that the loss of many of these rolls has prevented us from obtaining a more full and perfect knowledge on the subject.

In order to introduce my subject, it will be necessary to give a slight sketch of the events in the history of the Order which preceded the arrival of the Templars in Ireland.

The capture of Jerusalem by the Turcomans in 1065 A.D., and their harsh treatment of pilgrims to the Holy Sepulchre, outraged the religious feelings of Christendom to such a degree that, at the preaching of Peter the Hermit, everyone from prince to peasant was fired with an extraordinary enthusiasm, which culminated in the First Crusade, and the recapture of Jerusalem by the Crusaders in 1099. The flow of pilgrims recommenced with fresh ardour, but though the infidels had been driven out of Jerusalem, they still infested the country round about, and lost no opportunity of pillaging and slaying the unfortunate travellers. To remedy this state of things, nine noble knights, under Hugh de Payens and Geoffrey de St. Aldemar, formed themselves into a company for the protection of the pilgrims on their way from the coast to the Holy City. They styled themselves *Pauperes Commilitones Christi*, and bound themselves together under the rules of the Augustinian canons, with vows of chastity, poverty, and obedience.

At first they had no church or fixed place of abode, but in 1118, Baldwin, King of Jerusalem, gave them the church (which had since been turned into a mosque) erected by Justinian on Mount Moriah, on the south side of the so-called Temple of Solomon. This church, with the adjacent buildings and the large court between it and the Temple, became their headquarters until the Christians were finally driven out of Jerusalem. On account of their new habitation, they called themselves *Militia templi Solomonis*, and they also added to their original purpose the defence of the Christian kingdom of Jerusalem and all the sacred buildings. Baldwin induced St. Bernard, the Abbot of Clairvaux, to interest himself and the Pope in the new Order, and at the Council of Troyes, in 1128, St. Bernard undertook to revise their rules, and draw up a code of statutes for the government of the religious and military Order of the Temple.

By these rules, the Order was to be formed of Knights, who must be of noble birth, and *fratres servientes, frères sergents*, part of whom bore arms, while the rest were engaged in industrial occupations. The former were called *fratres servientes armigeri*, and were of the rank of gentlemen. They were allotted one horse each, and assumed the cross of the Order on their breast, when the like privilege was granted to the Knights. The Knights were to wear a white mantle (as emblematic of a white and pure life), but the esquires and retainers were to be clothed in black or brown. They were to live simply, two and two at common tables, while their meals were to be accompanied by spiritual reading. They were to cut their hair close, and each Knight might not have more than three horses. Tale-bearing and scandal were expressly denounced; and intercourse with women was to be strictly avoided. These rules were confirmed by a Papal Bull. Their original seal bore an engraving of two men riding on one horse, which, according to Matthew of Paris, was emblematic of their poverty, but Stow and others consider that it was symbolic of the charity of the Templars in taking up a wounded knight on their horse. The explanation of Matthew of Paris is hardly convincing when we know that each Knight might have three horses. This seal was afterwards changed to the *Agnus Dei*, with nimbus and banner. The Templars' original banner was the *Beaucéant*, half black and half white.

Hugh de Payens, soon after the Council of Troyes, came to England and Scotland, according to Hoveden, where he was extremely well received, and took away with him much treasure and many men.

The Order spread with remarkable rapidity, and gifts of land, money, and privileges flowed in upon the Templars. Pope Eugenius III (1146) gave the Order the right to wear a red cross on their white mantle, as a symbol of their readiness to shed their blood for the Cross. He also remitted one-seventh part of the Church fines to those who gave money to or entered the brotherhood. Hadrian IV gave them further exemptions from tenths, &c., but it was left to Pope Alexander III to confer on them the most convincing proof of the esteem in which they were held. In 1173 he gave formal permission to the Order to enroll priests as chaplains, and exempted them from episcopal authority. The brethren were exhorted to confess to their chaplains exclusively, “*car ils ont greignor pooer de l’apostoile, d’eaus assoudre, que un arceuesque.*” In the general enthusiasm, even princes hastened to enter their ranks, and bequeathed their domains to the Master and brethren of the Temple. Even as late as 1243, the Dominicans, by a statute of the General Chapter of the Order, engaged to solicit from each dying person whom they confessed a legacy for the Templars.¹

Meanwhile, the Templars were constantly recruiting their forces in the East from their preceptories in the West, and carrying on a stubborn and deadly contest against the Mohammedans. Unfortunately for the cause, they were continually at strife with the Order of the Hospitallers. This body had originated in the efforts of some Italian merchants to care for the sick at Jerusalem, but they gradually extended their sphere of action to protecting the pilgrims on their way to the Holy Sepulchre. They styled themselves Knights of the Hospital of S. John of Jerusalem, from S. John the Eleemosynary, a canonised patriarch of Alexandria, to whom the chapel of one of their hospitals had been dedicated; and finally became a military and monastic Order of Knights, like the Templars, for the protection of Christendom. These two Orders were continually at variance, and one of the charges afterwards brought against the Templars was that by their frequent quarrels they had injured the cause of Christ in the wars against the infidels.

There does not appear to have been any settlement of the Templars in Ireland before Henry II landed on these shores, as far as can be gathered from the Irish Annals. But the King of England, soon after his conquest of this country, granted by charter certain lands to the Order. We must remember that Henry II, to appease the indignation

¹ Michelet, “*Histoire de France*,” vol. iii., p. 120.

of the Pope at the murder of Becket, had vowed to make a pilgrimage to the Holy Land in person, at the head of a powerful army, and to provide for the support of 200 Templars. It may have been in part-performance of this vow that he granted lands in this country for the maintenance of the Knights, whom it is likely he brought in his train. The date of the grant is not accurately known, but it was confirmed by Kings Richard, John, Henry III, and Edward I, and the original charter was produced in evidence by the Master of the Templars in Ireland, in the famous case between him and the Abbot of Dunbrody about Crook, in County Waterford.¹ In fixing the date of the original deed of Henry II, we find an important factor in a deed chronicled in the Chartulary of S. Mary's Abbey, 1185, in which two of the signatories were Giraldus Cambrensis and Walter, Templar of Clontarf.² This proves that already, at that date, the preceptory of Clontarf, one of the lands granted by the King, had been founded. That the Templars, however, were in Ireland before this date is shown by a Christ Church Deed (No. 468), where two of the witnesses were Archbishop O'Toole and Matthew the Templar. Now, the Archbishop died in 1180, while the internal evidence shows that the deed was made *circa* 1177. Accordingly, we may conclude that Henry issued his charter to the Templars between 1172 and 1177.

This deed of Henry II was a grant in frankalmoign—i.e., on condition that the grantees prayed for the soul of the grantor and his ancestors. The lands, &c., comprised in this grant were the vill of Clumtorf (Clontarf), Crocum (Crook), with ten carucates of land, the vill near Waterford whose church is dedicated to S. Barry, a small marsh between the King's houses and the sea near Waterford, mills near Waterford, mills in Wexford, the church of S. Alloch, with the land belonging thereto, and Agnile, burgess of Wexford, with all his chattels.³ This is the only royal grant to the Templars in Ireland on record, but the nobles and feudal lords followed the royal example, and gave grants to the Order for the good of their souls. I have given in Appendix A a list of such Templars' lands as I have been able to trace, with the authorities in each case. It will be sufficient to enumerate here their manors, so as not to interfere with the narrative by considering all the small portions of land, chapels, &c., of which they were at one

¹ Cal. Irish Documents, 1285-1292, No. 622.

² Chartulary of S. Mary's Abbey, vol. i., p. 173.

³ Cal. Irish Documents, 1171-1251, No. 85; 1285-92, p. 329.

time or another possessed. In County Carlow they held Rathronan and Athkiltan; in County Dublin, Clontarf; in County Kildare, Kilcork and Rathbride; in County Louth, Coly (Cowley) and Kilsaran; in County Kilkenny, Ballygaveran (Gowran); in County Sligo, Teach-temple or Templehouse; in County Tipperary, Clonaul (Clonoulty); in County Waterford, Crook and Kilbarry; and in County Wexford, Kilclogan.

The designations of the different classes of the Order were very confused. The head of the whole Order in Christendom was called the Grand Master, but the titles of the various heads in the countries where they had settlements differed considerably. The head of the Order in England went by the names, at different times, of Grand Prior, Grand Preceptor, and Master. Next under him came the Priors over the large estates, the several portions of which were governed by Preceptors, so called from the first words of the mandates issued by the Master to them—viz., “precepimus tibi.” They, in turn, governed the *servientes*. In Ireland, the chief was usually styled “Master of the Knighthood of the Temple in Ireland,” but sometimes he was called “Grand Preceptor”; under him we find Preceptors and *servientes*, but in no case in the existing authorities do we find the existence of Priors. The head of the Hospitallers, on the contrary, was always called “Prior” in Ireland, and the governors of the various estates went by the title of Master or Preceptor. A certain amount of confusion has been caused by the fact that Preceptors and preceptories existed in both Orders. The term “Commandery” did not come into use with the Hospitallers till some time subsequent to the dissolution of the Templars. Consequently, when we find, at the time of the suppression of the Knights of S. John, in the reign of Henry VIII, that some lands were called preceptories, it is not to be inferred that they had originally belonged to the other Order.

The Masters of the Templars do not appear to have had any settled abode in this country, and no preceptory was marked out as their headquarters, as Kilmainham was with the Hospitallers. Their whole time was probably taken up with their visitations to the several preceptories, and their journeys to London. At such visitations members were admitted into the Order; lands bought, sold, and exchanged, and presentations made to the vacant benefices.

The following is a list of the Masters of the Templars in Ireland as far as I have been able to ascertain. The dates given are not

those of their appointment, but only those within which I have found references to the several Masters.

c. 1186,	Walter the Templar.
—	Brother Guarnerus.
c. 1200–1210,	Hugh the Templar.
c. 1210,	Henry Foliot.
1234,	Ralph de Southwark.
1235–1250,	Roger le Waleis.
1257–1273,	Herbert de Mancester.
1278–1279,	Ralph or Robert de Glastonbury.
1288,	Thomas de Thoulouse.
1295–1301,	Walter le Bachelor.
1300,	Peter de Malvern. ¹
1302–1306,	William de Warenne. ²
1307,	Henry de Anet or Tanet.

The date of Hugh's tenure of the Mastership is very difficult to determine. There are several entries of his name as a witness to deeds in the Chartulary of Saint Mary's Abbey, but these have no date, and it is only by internal evidence that even an approximate date can be arrived at.

Of the above Masters we know little, except that Ralph de Southwark abandoned his habit, and that the Justiciar was ordered to arrest him in 1235 if he went to Ireland.³ Walter le Bachelor was excommunicated for making away with the property of the Order, and was confined for eight weeks in the penitential cell in the Temple Church in London. On his death, he was not allowed to be buried in the cemetery. His death and burial were the subjects of certain interrogatories by the inquisitors at the inquiry held in London in 1309–1310.⁴ (See Appendix.)

The position of the head of the Order was one of extreme importance. On many occasions the Master of the Templars in Ireland, together with the Justiciar, and sometimes the Prior of the Hospitallers, was appointed by the Crown to audit the accounts of the country.

¹ So in Plea Roll 28 Ed. I. Possibly he was only a deputy for Walter le Bachelor.

² In the suit between the Prior of Athassel and the Master of the Templars, the former alleged that William de Warenne was a "consanguineus" of Edmond le Botiller.

³ Cal. Irish Documents, 1171-1251. No. 2264.

⁴ Wilkins' "Concilia," vol. ii., p. 346.

Money received in aid, Peter's pence, &c., were often lodged with them to be transmitted to the proper quarters. As an instance of this, we find in the Receipt Roll, Michaelmas, 1301, Walter le Bachelor paying into the Treasury by brother W. de Triminham, 73s. 4d., which he had received from the collectors of the new custom of Waterford.¹ On one occasion the Master in Ireland was paid 120 marks for expediting some arduous affairs of the King, though what the business was we are not told.²

Besides the privileges mentioned above, the Templars enjoyed, under the authority of Papal bulls, freedom from paying tithes, and from excommunication of themselves or interdict on their churches by bishop or priest. They were allowed to visit the churches in the country once a year to make a collection for the Holy Land, and even if such churches were laid under an interdict, they were to be thrown open on their coming, and divine service was to be performed.³ Their dwellings, too, were to be considered as sanctuaries, and any felon flying there was safe from arrest. We have an instance of this on Plea Roll No. 13, m. 45 d. (Edward I), where the mayor and citizens of Limerick were summoned for allowing the escape of a felon who had fled to the Templars' house there.

Our own and the English records are also full of mandates from the king granting them protection, and freeing them from being impleaded except before the king or his justiciar, and from common summonses before the justices itinerant, as well as regards common pleas as pleas of the forest; from paying tenths for the Crusades out of their parish churches and other possessions; and prohibiting any mills being erected to their detriment.

Their extensive rights were, however, limited in cities, for they were strictly forbidden to have more than one guest-house in a city free from the common customs, as we see in the charters of Dublin and Limerick.⁴ Nor, free as they were from interference by the archbishops, were they absolved from paying procurations to them, as we learn from a command to Master William de Hothum and others (who, after the dissolution, were appointed farmers of churches belonging to the manor of Kilsaran) to pay the Archbishop of Armagh his procurations "prout temporibus retroactis hujusmodi

¹ Cal. Irish Documents, 1293-1301. No. 825.

² *Ibid.*, 1252-1284. No. 891.

³ Rymer's "Federa," vol. i., p. 334.

⁴ Cal. Irish Documents, 1171-1251. No. 2101.

procuraciones solvi consueverunt per manus dictorum Templariorum ibidem."¹

But perhaps their extreme immunity from the ordinary customs is best seen in the grant of Henry III, in which, after confirming all previous or future grants of lands, he declared they were to be free from all ameracements and aids, and from all works of castles, parks, bridges, and enclosures, and the providing carriage for such works; that neither their woods nor their corn should be seized for such a purpose; that they might take from their woods to supply their houses, without forfeiture for waste or being amerced, and might clear any of their land of wood, or recover it from the forest, without being subject to waste regard and view of foresters, or requiring licence of bailiffs. They were to be free of all tolls in every market, fair, bridge, way, and sea, and their own markets and fairs were to be free of tolls. If any of their men were condemned to lose life or limb for a crime and fled, the criminal's goods should revert to the knights instead of the king; similarly, if any tenant of theirs forfeited his fee, they might put themselves in seizen, and if any tenant was amerced for any cause, the amercement was to be collected and handed to the Templars. Unclaimed waifs found in their fees were to belong to them, neither should they forfeit by lapse of time any of the liberties contained in this charter. Even these privileges were added to by Edward I, who gave them complete criminal and civil jurisdiction over their tenants and vassals, and power of punishing any found guilty of acting criminally towards them. He also gave them the power of trying criminals by ordeal, the tremendous privilege of pit and gallows, and, finally, freed them from all military services and ordinary feudal customs.

It will easily be supposed that men endowed with such powers were wont sometimes rather to extend their scope than otherwise. The Pope had, on one occasion, to forbid them extending their exemptions, and from using them to the detriment of the power of the bishops. The Synods, too, frequently complained about their misuse of their privileges. One of the chapters of the Statute of Westminster, II (chap. 43), was expressly framed to prevent the conservators or keepers of the privileges of the Templars and Hospitallers from bringing men before them in matters which belonged to the cognizance of the king's court, and from using general citations, without expressing the matter upon which the citation was made.

¹ Mem. Roll, Exchequer, 7 Ed. II, m. 15.

Although the Templars were only allowed one guest-house in each city to be free of tolls, some of their other tenants, e.g., in Waterford, tried to escape paying the usual services to the citizens on the ground of their belonging to the Order.¹

But the Templars found their privileges frequently attacked. In 1254-5, the collectors in Ireland of the aid granted to the King by the Pope in favour of the Holy Land attempted to levy it on the Templars, who were exempt under papal authority. A letter from the King, in 1256, was necessary to stop such a proceeding.² They were several times assessed to supply armed men, but, on bringing the matter before the Justiciar, they proved their right of exemption, and won their cases. The right they possessed of making a collection in the churches once a year was often nullified by the clergy insisting on making their own collections first before they would allow the Templars to exercise their privilege.

When we consider the freedom which the Order possessed from the usual services, it is not to be wondered at that others tried to avail themselves of it too. Henry III had to forbid expressly any tenant of the King in Waterford, if he wished to retain his tenement, transferring himself to the land of the Templars. The latter, too, were in the habit of erecting crosses on their houses to signify their immunity, and this practice was imitated by the tenants of other lords, in the hope of also escaping their proper services.³

In trying to gain some idea of the administration of the Templars in this country, it is regrettable that there is so little evidence to go upon; but by putting together the few scattered data which are known, it will be possible in some slight degree to picture their life. The Master was the head of the Order in Ireland; but he and all the brethren here in Ireland were subject to the Master of the Templars in England. It is probable that he was elected by the latter, or by the General Chapter held by him, for though, in 1235, the King sent his mandate to the Justiciar to admit Brother Roger le Waleis as Master,⁴ this was merely an order to the former to recognize the authority of the latter, and does not mean that the King had any part in the election of a Master. It was apparently his duty to visit each preceptory and admit recruits. We find that Robert de Pourbriggs

¹ Cal. Irish Documents, 1171-1251. No. 1916.

² *Ibid.*, 1252-1284, No. 516.

³ Statute of Westminster, ii, c. 33. Coke's "Institutes," ii., pp. 432, 465.

⁴ Cal. Irish Documents, 1171-1251, No. 2264.

was admitted into the Order by the Master at Clontarf, John Romayn, at Kilbride, Diocese of Ferns, and Adam de Langeport, at Ciwerk (? Kilcork), Diocese of Kildare. It is extremely likely that the important business was transacted at his visitations, such as the appointment of clerks to advowsons, arranging transfers of property, &c. It does not appear that his tenure was for life, for we find Peter de Malvern as Master in 1300, but in 1308 he was only Preceptor of Kilclogan. Also William de Warenne was Master in the years 1302–1306, but at the date of the dissolution he was only preceptor of Clonaul. Under the Master came the Preceptors, who managed the several manors and estates belonging to the Order. Both the Master and Preceptors regularly went over every year to London to assist at the General Chapter. The Preceptors had their chaplains. Next came the *fratres servientes (armigeri)*, or esquires, men-at-arms, originally intended to defend the possessions of the Order from aggression, and to accompany the Templars to Palestine. In later times, however, the defence of the preceptories was their only duty. The Templars were several times assessed to provide men-at-arms for the protection of the country, and probably for the Scottish wars as well, but they always successfully resisted such a claim, on the ground that they were free from such service by royal grant. These *servientes* were not always esquires, for, according to the French text of the rules of the Order, which was of later date than the original Latin text, they might be of the citizen class. Next in order to this class came the *fratres servientes (famuli)*, or *servientes officii*, who performed menial occupations, such as farming, household work, &c. The Order farmed some of their land themselves, but portions they let out to tenants. They also possessed or leased small portions of land which were not large enough for a preceptory, and these were managed by stewards. Besides their free tenants, they had *firmarii* and *betagii* on their lands,¹ who had to give certain days' assistance in the year. The Templars, in their preceptories, held manor courts, and also ecclesiastical courts, in which a canonist, the *conservator privilegiorum suorum*, sat and dispensed justice.²

A privilege which they shared with the feudal lords of the time, and which was much prized, was that of having mills, to which not only their tenants, but neighbours also, came to have their corn ground. By the law of "milling soke," tenants were bound to support the

¹ Memoranda Roll, Exchequer, 4 Ed. II, m. 23.

² Addison's "Knights Templars," p. 59.

mills set up by their lords, who thus drew large revenues. In the charter of Henry II to the Templars, we find grants of mills; and Henry III expressly forbade any mills to be erected in Waterford to the detriment of the Knights. There is an interesting entry in reference to the mill of the manor of Coly. Soon after the seizure of the Templars' lands, John de Kent, farmer of the manor of Coly, reported that two stones of the manor mill were missing, and that consequently tenants "qui ad dictum molendinum sectam facere tenentur," as well as others of those parts, went elsewhere to get their corn ground, to the loss of the manor. The King ordered the farmer of Clontarf manor, who had two suitable stones which he did not want, to forward them immediately to Coly.¹ The value of these mills is shown by the fact that the water-mill alone of Kilsaran manor, late of the Templars, was the subject of a special grant to Master Philip de Erdeley.²

Another source of income lay in the churches which they possessed. The Templars took the tithes themselves, and put a chaplain in to perform the services at a small salary, by which they made a considerable profit. For instance, the church of Kilclogan was of the yearly value of 20 marks, but the chaplain was only paid four marks a year.

The corn and produce grown on the estates were evidently more than enough to feed the Knights and their retainers, for we find, in 1225, the King granting a licence for five years to the Master to convey his wheat whither he would throughout all Ireland for trading purposes.³ In 1213, the King also permitted the Templars to export their own wool for sale. The Knights' purchases, too, were sometimes on a large scale. In 1294, King Edward ordered the Treasurer and Barons of the Exchequer in Dublin to cause the goods of merchants and other subjects of the King of France found in Ireland to be seized and sold. The Templars bought these goods in great quantities, as we learn from the Receipt Roll of 1295, that Walter le Bachelor paid into the Treasury £230 18s. 4d., for goods so bought by him.⁴

An interesting point arises as to the nationality of the Templars and their followers in this country. The Knights were originally

¹ Memoranda Roll, Excheq., 3 Ed. II, m. 51.

² *Ibid.*, Excheq., 4-5 Ed. II, m. 9.

³ Cal. Irish Documents, 1171-1251, No. 1276.

⁴ *Ibid.*, 1293-1301, pp. 109, 110.

always of noble blood; but it is not clear if this condition was insisted on in later times. In Ireland, they were apparently Anglo-Normans. Many came over from England, while in the case of those received into the Order here, their names, such as Adam de Langeport and Robert de Pourbriggs, show an Anglo-Norman origin. But with regard to the *servientes* no such certainty exists. As mentioned above, the French text of the rules of the Order allowed this body to be recruited from the citizen class. Is it possible that the native Irish were enrolled in their ranks? In Plea Roll No. 76 (33 & 34 Ed. I, m. 27) we find an entry of the payment of £10 by the Master of the Templars for himself and all his men of Clonaul for all trespasses. Fortunately, the scribe has set out their names, which are as follow:—loghlyn o dufgyr, Tathug o dufgyr, Gillicrist Palmer o Kynagh, Donghoth o Kynagh, William Boy o molryan, Tathug car-rach o molryan, Dermod leche o molryan, maloghelyn o molryan, Auulyf o Kynagh, Kenedy o Kynagh, makyn mol K [] ogher o bolan, John o Kynagh, Simon Bouelk, James Pannebecer, Rysyn fil' John, Gill' God o molreny, [] moy rayne, []. Who were these men? Probably not free tenants, as they were usually Anglo-Normans. It does not seem improbable that these were *servientes* attached to the preceptory. If this theory is correct, and the Templars did fill up the ranks of their followers in Ireland from the native Irish, it is likely that these attendants followed them to the Crusades. We know that drafts of the Order left this country for Palestine, for the Pope issued a mandate to the Archbishop of Dublin (on complaints from the Templars) not to extort money from those going to the Holy Land, as they were free from the Constantinople subvention. Perhaps those drafts included the Irish referred to by Tasso:—

Sono gl' Inglese sagittari, ed hanno
Gente con lor ch'e piu vicina al polo:
Questi dall' alte selve irsuti manda
La divisa dal mondo ultima Irlanda.

Tasso, Ger. Lib., canto i.

It would be only reasonable to expect that men placed in such a high position as the Templars, endowed with such liberality, and favoured with such immunities, should have left a considerable mark on the history of their times. But the only reference to them in the Irish Annals states the fact that in 1183 the Orders of the Templars and the Hospitallers were confirmed.¹ This, however, is a

¹ Annals of Ulster; Grace's Annals; Clyn's Annals; and Chartulary of S. Mary's Abbey, vol. ii., p. 305.

mistake, as the Order of the Templars was confirmed in 1128, and that of the Hospitallers in 1113. Probably what the Annalists intended to convey was that in 1183 Pope Lucius confirmed them in the privileges granted by Pope Alexander. As far as Ireland is concerned, one single incident, narrated by Matthew of Paris, is the only evidence we have of their mixing themselves up in the national struggles, and in this case they only acted as mediators. He tells us that Earl Richard, on being informed of the hostility which the Anglo-Norman nobles were manifesting towards him, came over in person, in 1234, to meet his enemies. The Templars, who acted as negotiators in the matter, were instructed, on the part of the nobles, to inform the earl that they (the nobles) had taken up arms against him on account of his treacherous behaviour towards the King, and that they desired to learn from the King how he wished them to act, as he had committed the defence of the country to them. Both parties met at the Curragh of Kildare to hold a conference, which resulted in a combat, when the earl was mortally wounded.¹ Sir John Gilbert, indeed, in his *History of the Viceroyalty*, tells us that, in 1274, Guillaume fitzRoger, Master of the Knights of the Temple in Ireland, was taken prisoner in an engagement at Glenmalure with the Irish, who slew numbers of his companions in arms.² This, however, is an error, as Guillaume fitzRoger was Prior of the Hospitallers, and it was those Knights who suffered such a reverse.

If the Templars left little record of themselves in the national struggles which distracted Ireland at that time, the same cannot be said of them in the legal contests of the period. The records are full of entries of cases to which the Knights were parties, in connexion with the right of presentation to churches, pleas of land, and other matters. The entries on the records are most tantalizing, as they are often mere notes of appointment of attorneys by either party to the suit. Doubtless, if all the plea rolls had been preserved, we should have been able to obtain a fairly extensive knowledge of the proceedings, as in some cases which we possess there is a full account of the pleadings. In 1253 they had a dispute about the advowson of the chapel of Ballygaveran.³ They also contested the right of presentation to the chapel of Balliscarva with the Archbishop of Cashel.

¹ Mat. Paris, *Chronica Mag.*, vol. iii., p. 274.

² Gilbert's *History of the Viceroyalty of Ireland*, p. 123.

³ Close Roll (Eng.), 38 Henry III, m. 13d.

The latter was non-suited, and amerced in a fine of £100; but the King pardoned him the half of it in 1274-5.¹

The most famous case they had was that in which the Abbot of Dunbrody Abbey prosecuted against them a plea of entry of *novel disseisin* of five carucates of land in Crook, County Waterford. The case commenced in 1278, before the Justices of the Common Pleas. The Master of the Templars pleaded privilege of his Order, in consequence of which the case came before the King and his Justices assigned to hold pleas in England. The Abbot claimed that his predecessor had been enfeoffed by Gilbert of Essex, and that King John had confirmed the grant. The Master, in defence, put in the charter of King Henry II, by which the lands of Crook had been granted to the Templars. The cause dragged its slow length along, and even when it was brought by the King's order from Ireland to the King's Bench in England, it was delayed by the absence of the King in Gascony. At last, in despair, in 1290, the Abbot presented a petition to the King, setting forth that he felt himself grievously oppressed, and his house reduced to the greatest poverty by the procrastination of this plea in various lands, and accordingly supplicated His Majesty to direct his Justices to proceed as quickly as they could regarding it, until it should be judicially determined. He said that he could not keep hospitality or rule his convent if he were to further prosecute the plea against such powerful adversaries as the Templars. The result was that a compromise was effected by the Abbot giving up all claim to the lands of Crook, in consideration of the payment of 100 marks by the Master. A full account of the proceedings will be found in Calendar Irish Documents, 1285-92, No. 622.

Whilst this cause was going on, a plaint was held in the Court of the Liberty of Wexford, in 1280, between the Master of the Templars and the same Abbot, about seven carucates of land in Kilbride which the Master averred he held *in capite* from Sir W. de Valence.² Although seisin was restored to the Abbot, the matter did not end here, though we find, in 1285, the Master refusing to proceed further in the case against the Abbot. The latter held it for some time, till, in 1332, the King ejected them on the ground that Kilbride, having belonged to the Templars, lawfully came into his hands on the dissolution of the Order. It was finally allowed to revert to the Abbot in 1334, in which year the Hospitallers quitted claim to him of all

¹ Cal. Irish Documents, 1252-1284, No. 1086.

² *Ibid.*, 1252-1284, No. 1647.

the right they had, or might have, in the lands as heirs of the Templars.¹

In 1298, the jurors of County Kildare presented the Master for having no horses ready at Kilcork, "sicut assessi fuerunt."² There is no record of further proceedings, but he was probably acquitted, as the Order was not liable for such service. In the same year and place the preceptor of Kilcork was presented for having killed a cow belonging to Alice, daughter of Thomas flecher.³

Another important case arose upon an action of *quare impedit* brought by Matilda la Botillere against the Master of the Templars, in 1302, for preventing her presenting a fit person to the vicarage of Carlingford. The Master produced a deed by which Matilda de Lacy had granted to the Order the lands of Coly and the right of presentation to the Church of Carlingford. Matilda replied that there was a rectory as well as a vicarage attached to the church, and that the deed of Matilda de Lacy had only given the Master the right to the rectory; but the Master showed to the satisfaction of the Judge that the vicarage was an appurtenance of the church. Accordingly the custodian of the spiritualities of the Archbishop of Armagh was ordered to admit a fit person presented by the Master. Matilda was fined six marks, of which forty shillings were to be given to the clerks, and the rest to the Templars.⁴

In 1302, the Master complained against John Wodelok, Sheriff of Dublin, Roger Prude, and John Halfheued, not only for seizing and selling 16 cows, 6 heifers, and 279 sheep, but for doing so at a lower valuation than was right. Their defence was that they had been ordered by the Exchequer to levy 20 marks on the said Master. The Treasurer and Barons of the Exchequer, being called, pleaded that the Master had been fined in that sum before brother William de Ros, prior of the Hospital of S. John of Jerusalem, and lieutenant of the Justiciar, for not supplying horses and men-at-arms. Thereupon William de Ros was called, and he said it was true that he had summoned all the religious to appear for the assessment of horses and men for the defence of the country, and that the Preceptor of Clontarf had appeared for the Master, and shown that he and his predecessors had always been free from such service by royal charter, and that conse-

¹ Chartulary of S. Mary's Abbey (Gilbert), vol. ii., p. lxxxvii.

² Plea Roll, 26 Ed. I, Roll 30, m. 9.

³ *Ibid.*

⁴ *Ibid.*, 30 Ed. I, Roll 64, m. 19.

quently he had allowed him to go free. Accordingly judgment was given in the Master's favour; John Wodelok and John Halfheued were fined 46s. 6d. for unjustly seizing and badly keeping the cattle of the Templars, and the valuers were fined 93s. for false appraisal.¹

In the same year, the Master of the Templars' goods (to the amount of forty acres of wheat and oats) were distrained, on account of his having taken 46 cows, value five shillings each, of the goods of Walter le Bret, which had come into the King's hands.² In 1304, the Master had to proceed against John de Kilsaran to render an account of the Templars' tithes received by him in County Louth.³ In 1305-6, the Master was obliged to appear in court and pay a fine of £10 for all trespasses of himself and his men at Clonaul.⁴ At the time of the suppression of the Templars, the Master and the Prior of Athassel were at law about the advowson of the chapel of Ardmail, County Tipperary. At the court held before the Justiciar, in the octave of the Purification, 1308, the Master failed to appear. The sheriff was ordered to serve a writ of *scire facias* upon him, but made return that the Templars had been seized and their goods had come into the hands of the Crown. The Prior was told to proceed against the Crown if he so desired.⁵

Of the other cases in which the Master of the Templars was involved, the record is too slight to afford any useful information.

Meanwhile, affairs had been going badly with them in the East. Jerusalem had fallen, and gradually the Christians were driven out of Palestine. The Templars had performed prodigies of valour, but the quarrels between them and the Hospitallers had neutralized their efforts. Indeed, the fall of Ptolemais in 1291 was attributed to their feuds. Pope Nicholas desired to unite the two Orders; but the Templars were completely hostile to such an idea. Their pride had made them many enemies, and had become proverbial. King Richard is reported, on his deathbed, to have bequeathed his pride to the Templars, as being the most fitting recipients. Their privileges, too, were not such as to endear them to the ecclesiastics, who viewed their exemptions with great jealousy. They were now, at the end of the

¹ Plea Roll, 30 Ed. I, Roll 65, m. 31d.

² *Ibid.*, 30 Ed. I, Roll 65, m. 31.

³ *Ibid.*, 32 Ed. I, Roll 68, m. 29d.

⁴ *Ibid.*, 33 & 34 Ed. I, Roll 76, m. 27.

⁵ Justiciary Roll, 35 Ed. I, m. 52.

thirteenth century, a strong, rich corporation of men who had fallen from the high ideal with which they had started their Order, and whose original purpose had been rendered useless. A body of 15,000 knights, many of the fine flower of the nobility of the land, subject only to their Grand Master and the Popes, constituted a formidable body of men, and their riches could not now be excused on the ground that they were for the defence of the Holy Land. Founded, as they had been, for the protection of the Christian pilgrims, they had degenerated into the bankers of the Popes and Kings. The constables of the Cross had become the cashiers of Christendom. Rumours also were current of their infidelity, idolatry, and bestiality. Some curious verses are to be found about them in the Book of Howth, and I quote two verses, depicting their fall from their high estate.

While they lived in wilful poverty
 These crossed Knights in mantles clad in white,
 Their names spread in many far country,
 For in their perfection was set all their delight.
 Folk of devotion caught an appetite ;
 Therefore to increase gave them great almes,
 By which they gen increase in great riches.

By process within a few yeares,
 The number great of their religion,
 And the fame of the said Templers,
 Gan spread wide in many region,
 With towers, castles, they gave them to delices,
 Appelled in virtue, which brought in many vices.¹

The Order might yet have continued to exist for many years, had not Philip le Bel, King of France, determined on their downfall, for it must be remembered that the Hospitallers also enjoyed large exemptions, and considerable property, yet they continued for centuries before their existence was terminated in different lands. But Philip was a poor as well as a masterful man, and his necessities had not been satisfied by his recent pillage of the Jews. The powerful Order of the Templars had, on several occasions, come into conflict with him. It is clear that he had some time before come to the determination to destroy this "imperium in imperio," and, while getting rid of this obstacle, also refill his impoverished exchequer; but this could not be done without the consent of the Pope. Accordingly, on the death of Benedict XI, he used his influence to obtain the

¹ Book of Howth, p. 235

election of Bertrand de Got, Archbishop of Bordeaux (Clement V), to the Apostolic See; and the rumour was current that one of the terms upon which Philip made his assistance conditional was the destruction of the Templars.

The charges against the Templars of heresy and impiety, which Philip brought to the Pope's notice, left the latter no option but to summon de Molay, the Grand Master, before him. This he did in 1307, ostensibly on the ground of discussing matters concerning the Holy Land, but he also informed him of the grave imputations which had been brought against the Order, and urged upon him the necessity of union with the Hospitalers. To this proposal de Molay strenuously objected, and asked for an inquiry into these terrible charges. The Pope wrote to Philip, on the 24th August of the same year, that he had at first considered the charges as incredible, and that the Grand Master desired an inquiry. The King of France, finding that the Pope was temporising, decided to act for himself. On the 14th September he sent out a *lettre de cachet* to the governors and crown officers throughout France, commanding the arrest of the Templars, and the detention of their goods. But such secrecy was observed in the preparations that de Molay was entirely ignorant of them even a month later, for we find him, on the 26th October, assisting with Philip at the funeral of Catherine Courtenay, wife of Philip's brother. The next day the bolt fell, and de Molay and 140 of the brethren were arrested. Such an assumption of the Papal authority aroused Clement, who wrote, on the 27th of the same month, to Philip, upbraiding him with his action.

Meanwhile Philip had been bringing his influence, both by letter and by his ambassador, to bear upon King Edward II. But this monarch, as will frequently be seen, was by no means willing to follow in the course marked out for him by Philip, and exhibited a restiveness under the spur which at times seemed to bode ill for the chances of the King of France. Still, after a show of resistance, he always ended by yielding to the pressure. It would seem that at first he contemplated taking a decided stand, for instead of instantly submitting to Philip's will, he wrote, on the 30th October, acknowledging a letter he had received from him about the detestable heresies of the Templars, and informing him that he had communicated it to his nobles and prelates, to whom, as to him, the contents seemed incredible, but that he would make inquiries himself. But the Pope soon came to Philip's assistance, for, quickly recovering from his fit of indignation

at the King's precipitate action in arresting the Templars, he issued, on the 22nd November, his bull to Edward to imprison the Knights.¹ In this bull he set forth that at the beginning of his pontificate rumours of the heretical depravity of the Templars had reached his ears, but that he had been unwilling to listen to such suggestions on account of their noble behaviour in the past. Since then, however, stories of their heresy and immorality had been told to the King of France, who, at the request of the Inquisitor of heretical depravity in his kingdom, had caused the chief persons of the Order to be imprisoned, and their goods conveyed to safe custody, in order that an inquiry might be made. He also set forth that the Grand Master had confessed to the heretical practices; and that he had personally examined one Knight, who acknowledged having denied Christ on entering the Order. Accordingly, he exhorted the King to imprison the Templars, and keep their goods safely till he heard further from him.

But Edward still remained obdurate. By letters to the Kings of Portugal, Castile, Sicily, and Aragon, on the 4th December, he urged them not to believe the accusations against the Templars, in view of their good deeds; and on the 10th he wrote to the Pope that he was unable to credit the terrible charges brought against the Order, and desired to take no steps till their guilt had been more clearly manifested. After such efforts on behalf of the Knights, we are more than surprised to find him, ten days later—viz., on the 20th December—issuing his writ to various officials to arrest the Templars in his dominions, and on the 26th of the same month informing the Pope that he would carry out his orders. The arguments of Philip were evidently of sufficient force to override the scruples of his future son-in-law. The writ for Ireland was directed to John Wogan, Justiciar, and the Treasurer; and a copy of the ordinance sent to English officials was enclosed for their guidance. By this writ they were instructed to cause a day to be appointed for the execution of the ordinance without delay, so that it might be executed before the news of the like event in England could reach these shores. The English ordinance ran as follows:—

“For certain sure reasons it is ordained by the lord the King and his Council, that, on Wednesday next after the feast of the Epiphany next coming, all the brethren of the Knighthood of the Temple in every county of England be attached by their bodies by the sheriffs

¹ Rymer's "Federa," vol. ii., p. 18.

thereof, and by some lawful men of the same counties; and that all their lands, tenements, goods, and chattels, as well ecclesiastical as temporal, be seized and taken into the hands of the said King, together with the charters, writings, and muniments of all kinds belonging to the said brethren, and that of those goods and chattels and of the value thereof be made a lawful inventory and indenture (in presence of the keeper of every of the places of the said brethren, whoever he be, a brother, namely, of that Order or another person, and in presence of two lawful men neighbouring and nearest to the said place who can conveniently be present), one part whereof shall remain with the said keeper and the other with the sheriff, under the seal of him who shall have caused those goods and chattels to be so seized, and that those goods and chattels be placed in safe and secure custody, and that the cattle and beasts of the said brethren be well kept and maintained out of the goods aforesaid, as shall seem most convenient to be done, and that their lands be cultivated and sowed out of the issues thereof, to the best advantage and profit which can be done, and that the bodies of the said Templars be kept safely, securely, and faithfully, in a suitable place, elsewhere than in their own dwellings, so that their keepers may be sure of the bodies of the said brethren, provided, however, that they be not in a cruel and loathsome prison, until the King shall think fit to make other order thereon, and that reasonable sustenance be found for the said brethren, as becomes their rank, out of the things and goods so to be seized by the commands of the said King, in competent manner. Which things being performed, let the Sheriffs make known by their letters to the Treasurer and Barons of the Exchequer at Westminster, how many brethren and whom they shall have caused to be arrested, and their names, and where and under what custody they shall have placed them, and let them send transcripts of the indentures which shall be made thereof to the said Treasurer and Barons, and let them make known to the same distinctly and plainly what lands and what tenements of the said brethren shall have been so seized, together with their whole proceedings in this behalf, so that the said Treasurer and Barons on the morrow of the Purification of the Blessed Mary next coming may be fully certified thereof by the said Sheriffs."

Then follows a description of the manner in which the ordinance was executed in England. The King first sent down writs to the sheriffs to warn ten or twelve lawful men of their bailiwick to be in a certain place in the county on a certain date, and to be present

there themselves; and then the King sent down sworn clerks with the writ against the Templars and the ordinance, which were delivered to the sheriffs after they and the lawful men had been sworn not to divulge the matter to anyone before the writ had been executed.¹

On reading the above ordinance, one is struck not only by the extreme care which was taken to surprise the Templars, but also with the anxiety displayed that their lands and goods should be taken great care of, and that they themselves should be treated with due consideration.

The writ and ordinance did not reach the Justiciar till the 25th January, 1308; but no time was lost, for the day fixed for carrying out the ordinance in Ireland was the morrow of the feast of the Purification (3rd February). On this day the lands of the Templars were seized by the sheriffs. The Knights were conveyed to Dublin, while careful inventories of their effects were drawn up.

These inventories, together with an account of the proceedings in each case, will be found in the certificate of the Barons of the Exchequer sent to the English Exchequer (1 Edward III).² According to these returns, the goods of the various preceptories and estates were valued at £716 16s. 6½d. The Inventories give a very precise list of household goods in the guardians' chamber, in the hall, cellar, kitchen, granary, bakehouse, stable, and smithy of each preceptory; of farming implements and stock, with ecclesiastical ornaments, garments, and books. The details are interesting. In the Kilclogan preceptory, the bed of Walter de Joneby was valued at one mark, that of the chaplain at ten shillings, while the bed of Adam de Langport was only worth half a mark. The *servientes* probably had no beds at all. The minute detail of the inventories is shown by the fact that the items range from a fork, value 1d., one cruet of pewter, value 1d., and six rakes, each 1½d., to a missal worth 40s. Of books, except those for ecclesiastical purposes, we find but little mention, the most interesting being "un' lib' galic' script' de Evangelicis," which was found in the preceptory of Clontarf. But it is extremely surprising to find the abodes of a military order so poorly equipped with arms. Thus in Clontarf we only find three swords, price 3s.; in Kilsaran, a military cloak; in Kilclogan, two lances, each worth 6d., one iron helmet, worth 12d., a balister and two baudreys, price 3s., and a bow, worth 1d. Instead of the luxury we should have expected, the

¹ Memoranda Roll, Excheq., 1 Ed. II, m. 19.

² Accounts, &c. (Excheq. Q. R.), Bundle 239, No. 13, Pub. Rec. Office, London.

furniture and goods appear to have been of the most humble description. We find some mention of the current coin—e.g., the preceptory of Kilelogan possessed 36s. 6d.; that of Clonaul, £7 10s. “argenti”; while Clontarf only had 3s. “in pecunia numerata.” The Templars’ greatest wealth was in corn, oats, and cattle. Altogether these inventories throw considerable light on the prices of goods at that time. I have given a copy of the inventory of the manor of Clonaul in Appendix B; but the fullest list will be found in the inventory of Kilelogan, a translation of which has been printed in Hore’s *History of the County of Wexford*, under that head.

No mention is made in these inventories of deeds and manuscripts which were ordered to be taken. We may feel quite sure that the Treasury were sufficiently awake to their own interests to secure any title-deeds which the Templars possessed. That they did so we have proof in the case when John de Haddesore and others, who had been under agreement with the Knights to farm the tithes of some churches in the manor of Kilsaran, were attached to answer the King (1312) for the rent due to the Knights at the time of their suppression.¹ The deed or contract made between them was produced in court to prove the right of the Crown as heirs of the Templars.

According to the ordinance, returns should have been immediately made to the English Exchequer certifying the number and names of the brethren, where they were imprisoned, and the lands seized, with all the proceedings in the matter. This apparently was not done, probably owing to the fact that Alexander de Bickenor, the Treasurer in Ireland, was appropriating to himself some of the Templars’ goods. The certificate mentioned above was that returned to the English Exchequer by the Barons in Dublin, to enable the former to discover the amount of defalcations of the late Treasurer.

Guardians of the lands of the Templars were now appointed to manage the estates and exact the usual rents and services from the tenants. At the time of the suppression there were rents due from these tenants, and collectors were appointed, with the injunction that they be paid in haste. Evidently the King was in want of money. At this time he was conducting his Scotch expedition, and had frequent occasion to order the authorities in Ireland to forward provisions to Scotland for his troops. He was not likely to neglect such a windfall as the goods of the Templars. Accordingly we find that, on the 19th June, 1308, the Justiciar and Treasurer were

¹ Memoranda Roll, Excheq., 5-6 Ed. II, m. 50.

ordered to provide for the expedition to Scotland, in addition to the supplies elsewhere ordered to be provided in Ireland, 1000 quarters of wheat, 1000 quarters of oats, 200 quarters of beans and peas, 300 tons of wine, 3 tons of honey, 200 quarters of salt, 1000 stock fish, out of the goods in Ireland of the Knights Templars in the King's hands, so far as the same would suffice.¹

The Templars were now prisoners in Dublin Castle, but, as they had been deprived of all their goods, it became a question as to how they were to be supported. So Piers Gaveston, who arrived as the King's deputy in July, 1308, allowed them to retain the issues of the manors of Kilclogan, Crook, and Kilbarry, to provide them with sustenance during their captivity.²

In France matters were advancing with a haste which showed Philip's determination to settle the business once for all. The Pope employed all kinds of procrastination, only to be forced to yield to the King's masterful disposition in the end. The former was induced to appoint inquisitors to hold the inquiry in France, reserving to himself the personal examination of the chief officers; but these suspiciously fell ill on the way to Poitiers, and so they had to be examined by the inquisitors. The story of the treatment of the Templars in France by Philip forms one of the most heartrending narratives to be found in history. Under the influence of the most cruel tortures, they confessed to crimes which they afterwards recanted, often without avail. An excellent account will be found of these proceedings in Michelet's "*Procès des Templiers*"; but as it is outside the scope of the present paper, I will not touch further on this portion of the subject.

On the 12th August, 1308, the Pope issued four bulls.³ In the first, "*Faciens Misericordiam*," he appointed Commissions in different lands to examine the Templars, to be composed of the diocesan bishop, two canons, with two Dominicans and Franciscans, for each diocese, and sixteen questions were to be put. In the second, "*Regnans in cœlis*," he detailed the history of the events leading up to the present crisis, and ordered the bishops, &c., to appear, two years hence, on 1st October, 1310, to decide the fate of the Order. The third bull, "*Deus ultionum Dominus*," appointed the prelates as curators and administrators of the Templars' goods; while the fourth, "*Ad omnium fere notitiam*," ordered that all the Templars' goods

¹ Patent Roll (England), 1 Ed. II, part 2, m. 3.

² Memoranda Roll, Excheq., 5-6 Ed. II, m. 12.

³ Von Hefele's "*Conciliengeschichte*," vol. vi., pp. 436-8.

already seized should be returned, under penalty of excommunication. The third of these bulls was inoperative in Ireland, as the King had already appointed as curators over the lands and goods men who certainly were not prelates. With respect to the fourth bull, the King took care that any goods taken should be restored to him, for we find frequent mandates to that effect in the Memoranda Rolls; but, as we have seen above, this store was drawn upon not only by the King to provision his army in Scotland, but by Alexander de Bickenor, the Treasurer, for his own pocket. Some rumours of these and similar transactions in England may have come to the Pope's ears, for, on the 4th October, he wrote to the King about the matter, to which Edward boldly replied, on the 4th December, that he had done nothing up to the present about the goods of the Templars, nor would, in future, otherwise than he ought.

Clement now appears to have lost all pity for the Templars, for, on the 30th December, he issued his bull, "*Calide Serpentis*," proscribing the Order, and refusing to allow any to help or counsel them.¹

It is difficult to say whether diocesan inquiries were held as ordered by the bull, "*Faciens Misericordiam*," in Ireland; but inquisitors were sent over by the Pope for the general management of the Provincial Councils of Inquiry in these countries. On the 29th September, 1309, the King wrote to all bailiffs and faithful people that Thomas de Chaddesworth, Dean of Dublin, Bindus de Bandmellis, Canon of S. Paul, diocese of Florence, and John Balla, Canon of Clonfert, had been assigned to make inquiries in Ireland by the chief inquisitors sent to England by the Pope, and ordered them to assist them.² He also ordered the Archbishop to be present whenever the inquisitors held the inquiries. To make the investigation as complete as possible, he bade Wogan to take any Templars not yet in custody, and guard them in Dublin Castle, "*repraesentandos coram venerabili patre electo Dublin' vel ejus vicario, ac praefatis inquisitoribus deputatis*," whenever required.³ An additional deputy was sent in the person of Master John de Solercio.⁴

The public interest in the fate of the Order at this time must have been stirred up to an extraordinary extent. There is a curious entry

¹ Von Hefele's "*Conciliengeschichte*," vol. vi., p. 439.

² Rymer's "*Federa*," vol. ii., p. 93.

³ *Ibid.*

⁴ Patent Roll (England), 3 Ed. II, m. 32.

in the Book of Howth, which would seem to show that it was the absorbing topic of the time. It reads as follows:—"Also on the morrow of Saint Luce the Virgin, the three year of the reign of Edward, there was six moons, which was marvelled much of. They were of divers colours, whereby it was judged ("jugent" in MSS.) and thought that the Order of the Templars should be suppressed and done away for ever."¹ In the Annals of the Chartulary of S. Mary's Abbey the date is given as the sixth year of Edward II;² but as this would have been after the suppression of the Order by the Pope, it is probable that the third year of that reign was the time of this singular occurrence.

The inquisitors were apparently only sent over to arrange for the inquiry, for, in the account of the investigation which took place for the province of Dublin, which is preserved in the Bodleian Library at Oxford, and is the only account for Ireland extant, their names do not occur.³ The inquiry was held in Saint Patrick's Cathedral; and Mason is wrong in asserting that it took place in Dublin Castle. It was commenced in the month of January, 1310, though it is impossible to give the exact date, as the account we have of the proceedings is imperfect. The earliest date mentioned is the 6th February; but there is evidence in the document that the proceedings commenced some days before this. Henry Tanet, the late Master, declared, in his examination before this tribunal, that he would have spent three years in Ireland on the vigil of the Purification next, which would be the 1st February. As he was Master in 1307, the inference is that he was giving his evidence on some day prior to 1st February, 1310. The inquisitors consisted of brothers Richard Balybyn, ex-minister of the Dominican Order in Ireland, Philip de Slane, reader of the same Order, Hugh de St. Leger, of the same Order, Roger de Heton, guardian of the Franciscan Order, Dublin, and Walter Prendergast, rector of the same. They were not all present at each sitting, their numbers varying at different times. Master John de Mareschal, Canon of Kildare, was also present as commissary of the Bishop of Kildare, on one occasion; also Masters Philip de Hendelee, officer of the court of the archdeaconry, Matthew de Wella, and Philip de Wylabi, rector of the church of Balisgressim (Balgriffin), dio. Dublin. To each of the Templars examined a series

¹ Book of Howth, p. 129, f. 68.

² Chartulary S. Mary's Abbey, vol. ii., p. 341.

³ Wilkins' "Concilia," vol. ii., p. 373.

of eighty-seven interrogatories was administered, which may be briefly summarised as follows :—

They were accused of denying Christ at their reception ; of being told by those receiving them that Christ was not the true God, and did not suffer for our redemption ; that the receiver made them spit on the Cross, or offer it some other mark of indignity ; that they adored a certain *catum* ; that they did not believe in the sacrament of the altar ; that the priests of the Order did not use the words by which the body of Christ is made in the canon of the Mass ; that the Grand Master, or Visitor, or Preceptor, could absolve them from all sin ; that, on reception, the receiver and received indulged in unclean kissing ; that the reception of the Order was clandestine ; that they made and adored idols ; that they touched these idols with cords, with which they girt themselves ; that those unwilling to conform to such practices were killed or put in prison ; that they were enjoined on oath not to reveal such practices ; that they were ordered to confess to none but brethren of the Order ; and that the brethren swore to advance the interests of the Order by any means in their power. Such were the accusations brought against them, to which they were compelled to reply.

The following Templars were examined :—Henry de Anet (or Tanet), the Master ; Richard de Bistesham, Ralph de Bradeley, Hugh de Broughton, Richard de Burchesham, Walter de Choneby, John de Faversham, Henry de la Forde, Henry de Haselakeby, Adam de Langeport, Henry Mautravers, Robert de Pourbriggs, John Romayn, Richard de Upladen, and William de Kilros, chaplain. They were unanimous in denying most of the charges, but on the question whether the Grand Master could absolve them from sin, there was some diversity of opinion, as three of the Knights admitted that he could, though two of them afterwards denied it. William de Kilros, the chaplain, admitted that when the Grand Master heard a confession, he ordered the chaplain to absolve the penitent, even though the chaplain had not himself heard the confession. He also mentioned one case of unnatural crime which had occurred in the Order. He attributed the suspicion under which the Templars had long lain to their being so suddenly exalted, and to their great friendship and converse with the Saracens. Several of the Templars were examined two or three times.

The witnesses for the prosecution were now examined, and it certainly throws a suspicious light on the proceedings that three of the inquisitors are to be found amongst the number. The witnesses

were as follow:—Brothers Roger de Heton, guardian of the Franciscan Order, Dublin; Hugh de Lummour, of the same; Walter de Prendergast, reader of the same; Nicolas de Kilmay, and Walter Wasphayl, of the same Order; Simon de Dachemound, Richard Kissok, Gilbert de Sutton, and Richard de Balybyn; Thomas de Racho, of the same; Nicholas Bakun, Richard de Boclone, John de Balmadoun, Robert de Lusk, Lucas Chyn, Thomas Cadel; Thomas, Abbot of S. Thomas the Martyr; Simon, Prior, and Marestellus, Canon, of the same; Richard de Gromekyn, Nicholas Byterel, Adam Barun, Roger Kilmaynan, Henry de Pembroke, Ralph Kilmaynan, William le Botiller, Henry de Stone, Gilbert de Rene, John Gay, Philip de Kenefeke, Roger, Prior of the Order of S. Augustine; Henry Wallens, David Longus, John de Waterford, Hugh le Marescall, John le Palmer, and John de Suerde. These were all religious, the laymen being only four in number, viz.: Adam le Latymer, Thomas de Broughton, an ex-serviens of the Templars; Robert de Hereford; and William de Bras.

On examination, the majority of the witnesses had nothing but rumours and gossip to relate; while Roger de Heton said he believed the charges because the Templars themselves had acknowledged them to the Pope, and because the Order was a secret one. The only two witnesses who had anything definite to depose to were brothers Hugh de Lummour and William le Botiller. The former declared that he was often at Clontarf, and had seen a Templar, named William de Warecome, turn his face to the ground at the elevation of the sacrament, not caring to look at the Host. William le Botiller testified that one day he assisted his brother, who was celebrating Mass at Clontarf, and that, at the elevation of the Host, the Templars kept their gaze fixed on the ground, and paid no attention to the reading of the Gospel. Also, after the *Agnus Dei*, he wished to make the brethren the kiss of peace, whereupon one of their own clergy told him that the Templars did not care for peace.¹

Such, in brief, is the evidence which was extracted by a prolonged inquiry, which lasted from January till the 6th June, 1310, with numerous sittings between those dates. It is impossible to say whether torture was applied to the prisoners, as no information is forthcoming on the point. We know that it was extensively employed in France, and that Edward II was induced, unwillingly, to follow in

¹ Wilkins' "Concilia," vol. ii., p. 373.

Philip's footsteps in this respect, though in a very much less degree.¹ German authorities admit that, in many cases in England, the threat was quite sufficient to obtain the desired effect.² Von Döllinger states that only two Templars in England succumbed to the torture,³ while Michelet goes so far as to deny that torture was applied to the English Knights at all.⁴ The absence of any evidence of the use of such means of extorting confessions on this side of the Channel may induce the hope that a more humane treatment was practised here.

On the 3rd April, 1310, the Pope wrote to the Archbishop of Dublin and others, putting off the meeting of the Synod at Vienne till the 1st October, 1311, on the ground that the inquiries had not yet been finished.⁵ In France they were still incomplete, while, as we have seen, the inquiry in Dublin was only then being held, and in London further examinations had yet to take place. During these latter, the Grand Preceptor of England, Ireland, and Scotland died in prison, refusing to confess to heretical doctrines.

What the result of the inquiry in Ireland was, and whether the inquisitors reported favourably or not on the conduct of the Order in this country, we do not know. In England and France the result was unfavourable to the Templars; but in Aragon, Castile, Portugal, and the archbishopric of Mayence the inquiries resulted in an acquittal.⁶

The Synod at Vienne opened on the 16th October, 1311, the objects for which it was held being (1) the recovery of the Holy Land; (2) the reform of the Church; and (3) to advise about the process of the Templars; but we may feel certain that the last issue was the most absorbing one, and overshadowed all the rest. More than three hundred bishops and prelates were assembled; the representatives of Ireland consisting of the Archbishop of Cashel, and the Bishops of Emly, Killaloe, and Cloyne.⁷ After a lengthy consideration of the case, the majority of the Synod declared that they had not sufficient evidence before them to condemn the Order. As soon as Philip heard that his plans were likely to fail, through the opposition of the Council, he immediately set out for Vienne (February, 1312) to use his personal influence with the Pope to urge him to dissolve the

¹ Rymer's "Federa," vol. ii., p. 119.

² Von Hefele, "Conciliengeschichte," vol. vi., p. 469.

³ Von Döllinger, "Akademische Vorträge," vol. iii., p. 248.

⁴ Michelet, "Histoire de France," vol. iii., p. 115.

⁵ Papal Registers, vol. ii.

⁶ Dublin Review, vol. cxvii., p. 343. "The Fall of the Knights of the Temple."

⁷ Labbé-Mansi, xv., 12.

Order, and give their goods to another Order of Knights. As usual, the hesitation manifested by Clement when at a distance from Philip vanished under the influence of a personal interview; and the Pope, by his bull of the 22nd March, beginning "*Vox clamantis*," dissolved the Order. This bull has only recently been discovered in Barcelona by Gams, the German Benedictine. Clement gave six reasons for his action: viz., that the Order had become of evil notoriety through heresy; that the Grand Master and many other Companions of the Order had made confessions of heresy, and of the other charges brought against them; that the Order was much hated by prelates and kings; that no righteous person was willing to defend them; that they had become useless for the Holy Land, for the defence of which they had been established; and, finally, that through putting off the sentence the goods of the Templars might be lost.¹

By a further bull of the 2nd May, "*ad providam*," he handed over all the possessions of the Templars to the Hospitallers.² In this document he expressly stated that he had dissolved the Order "*non per modum definitivae sententiae, cum eam super hoc secundum inquisitiones et processus super his habitos non possemus ferre de jure, sed per viam provisionis seu ordinationis apostolicae*," thus showing that the dissolution of the Order was grounded not on justice but on motives of expediency. By letters, also, of the same date, he ordered commissioners for carrying out this decree in England, Ireland, &c. The persons of the Templars were to be handed over to the provincial Synods, except the Grand Masters and three others, whom he reserved to himself. Philip, however, induced him to hand them over to a Commission of three Cardinals and the Archbishop of Sens, with the result that, on the Grand Master (De Molay) and the Grand Preceptor of Normandy declaring themselves innocent, they were condemned to be burnt; while the other two, who confessed, were condemned to prison for life.

It will be well now to consider how the Templars, imprisoned in Ireland, had been getting on. As we have seen, soon after their imprisonment the Earl of Cornwall had allowed them to retain their manors of Kilclogan, Crook, and Kilbarry for their sustenance. But it was one thing to manage their lands when they were free agents and in possession of enormous power, and quite another to obtain the

¹ Von Hefele, "*Conciliengeschichte*," vol. vi., p. 524.

² *Ibid.*, p. 523; Rymer's "*Federa*," vol. ii., p. 167.

profits of their property when they were confined in Dublin Castle. Robert Aylward, who had been put over the manors to manage them on behalf of the Knights, had frequently to be called upon to answer to them for the rents of their lands and tenants in Crook and Kilbarry.¹ The Crown was forced to call upon the tenants of the three manors to be intendant and respondent to the Master. The difficulty of obtaining the issues of their lands became so great that on the 4th December, 1311, the Master, Henry de Anet, and brothers John de Faversham, and Ralph de Bradelee petitioned the King that either they might be allowed out on bail and put back into the same position as they held at the time of their arrest, or that Wogan, the Justiciar, might hold the aforesaid manors for them, and provide them with sustenance. The King's Council agreed that the Templars could not be liberated without a special mandate from the King; but, at their request, the Justiciar consented to hold the manors for them, and give them the issues for their means of support. This was approved of by the King.² The Knights soon experienced the benefit of this change, for on the 3rd February, 1312, they acknowledged to have received £24 9s. 1½*d.* from the Justiciar.³

We shall probably be justified in supposing that after the Papal Bull, handing over the persons of the Templars to the provincial synods, those incarcerated in the Castle were liberated. In Michaelmas term, 1312, we find it on record that the Master, Henry de Anet, was let out on bail, Master William de Hothum and others being his pledges;⁴ and it is likely that the rest were liberated at the same time. As, soon after this date, viz., May, 1313, the lands of Kilelogan, which had been assigned to them for sustenance, were granted to Nicholas de Balscote,⁵ we may conclude that it was about this time that the regular pay of 2*d.* per diem was commenced to be paid to the Knights.

Since 1308, when the Templars were seized, their lands had been mostly managed by the Crown, who had appointed commissioners to supervise the estates, receive tithes and obventions of the churches, appoint bailiffs and servientes, collect the rents, &c., paying a certain rent to the Exchequer for such privileges. The manors and churches of Kilelogan, Crook, and Kilbarry, however, were excepted, as these were given temporarily to the Knights for their support. The only

¹ Memoranda Roll, Excheq., 4-5 Ed. II, m. 66.

² *Ibid.*, 5-6 Ed. II, m. 12.

³ *Ibid.*, 5-6 Ed. II, m. 24.

⁴ *Ibid.*, 6 Ed. II, m. 2.

⁵ *Ibid.*, 6-7 Ed. II., m. 47d.

instance we have of the Crown granting any of the Templars' lands in fee-simple was in the case of the manors of Clontarf and Kilsaran, which Edward granted (26th December, 1310) to Richard de Burgh, Earl of Ulster, the father-in-law of the Earl of Cornwall,¹ though they apparently soon reverted to the Crown. All the lands which had formerly been in possession of the Order the Pope desired should be handed over to the Hospitallers. On the 2nd May, 1312, he had written to the Archbishops of Armagh, Dublin, Tuam, and Cashel, and others, to defend the Knights of St. John, who had been placed in possession of the Templars' property in their respective dioceses.² But the former, however eager they were to enter into their new inheritance, were forbidden by the King (1st August, 1312) to meddle with the lands and goods of the Templars before the next parliament.³ In the meantime he continued to let out their property in Ireland, for on 12th May, 1313, a commission was issued to Nicholas de Balscote, Baron of the Exchequer, to hold the lands of Kilelogan and the church of Ballygavern at a yearly rent.⁴ But the Hospitallers were evidently becoming anxious about the transfer, for on 25th November of the same year, Brother Albert de Nigro Castro, Grand Preceptor of the Hospital of S. John of Jerusalem, and the *locum tenens* beyond the Mediterranean Sea of the Grand Master of the Hospitallers, and Leonard de Tybertis, Prior of the Venetians, Procurator-General of the said Hospital, petitioned the King that he would see fit to hand over to them the Templars' goods.⁵ This had the desired effect, for on the 28th November the King ordered the guardians of the Templars' lands in England, and in Ireland the Justiciar, Chancellor, and Treasurer of Dublin, to put the above-named brethren or their deputies in possession of the lands and goods, with all the rights belonging thereto, of the late Order. Edward alleged the necessity of conforming with the Pope's bull as the reason for his Order, but took care to protest that his and his subjects' rights were to be preserved.⁶

As a necessary consequence of this order, the Prior of the Hospitallers was bidden (8th February, 1314) to continue to the Templars the allowance of 2*d.* per diem hitherto allowed them.⁷

¹ Memoranda Roll, Excheq., 4-5 Ed. II, m. 21.

² Papal Registers, vol. ii.

³ Rymer's "Federa," vol. ii., p. 174.

⁴ Mem. Roll, Excheq., 6-7 Ed. II, m. 47.

⁵ Rymer's "Federa," vol. ii., p. 235.

⁶ *Ibid.*, p. 236.

⁷ *Ibid.*, p. 243.

Shortly after this, the King issued his writ (18th March, 1314) to Nicholas de Balscote to hand over the Templars' lands in Wexford, which he held, to Roger Utlawe, Proctor of the brethren of the Hospital, Brother Walter del Ewe, Prior of the Hospital, and Brother William de Ross. In this writ it is interesting to note that the "ornaments of churches" are expressly mentioned to be handed over to the Hospitallers.¹

Although in England some of the Templars were sent to monasteries to complete their penance, we have no record of their being so treated here. Twopence a day was allowed them for their maintenance, but it would appear either that this was not sufficient, or that the Hospitallers were relieved of this charge, and that it was thrown on the clergy, for we read that, on 1st December, 1318, the Pope ordered the Deans of York, London, Dublin, and Canterbury, the Priors of the Friars Preachers, and the guardians of the Friars Minors, to examine the taxation of stipends made by the archbishops and prelates, and bring it to the amount necessary for the support of the brethren of the late Order of the Templars, with this proviso that the latter were not to be allowed to lay up money or live delicately out of the sums provided by the said taxation. Also sentences issued by the archbishops and prelates against the Master and brethren were to be revoked.² From this, I think, we may gather that the Templars were still tenaciously clinging to their ancient rights in some parts of the country.

Notwithstanding Papal bulls and Royal mandates, the Hospitallers found great difficulty in entering into their heritage. Feudal lords were unwilling to allow the lands granted by their ancestors to escheat to any but themselves. Accordingly, a great conference was held in 1324, at which the King, his prelates and nobles, and other great men of the realm were present; and the matter was laid before them for decision. They agreed that the lords of the fee had a perfect right to retain the Templars' lands as their escheats, but it was decided by the King and his nobles, "for the health of their souls and discharge of their consciences," that, as the Order of Templars was instituted for the defence of Christians and subversion of the enemies of Christ, their lands, &c., should be delivered to other men of most holy religion. It was accordingly enacted that neither the King nor any other lord of the fee had any right or title in such lands, and

¹ Mem. Roll, Exch. 7-8 Ed. II, m. 41.

² Papal Registers, vol. ii.

that all the lands, &c., of the Templars should be assigned to the Order of the Knights of S. John of Jerusalem.¹

Yet even this Act does not seem to have produced the desired effect, as in 1329 we find the Pope still writing to the King exhorting him to cause restitution to be made to the Hospitallers of the property of the Templars.²

As far as Ireland was concerned, most of the property of the latter Order was inherited by the Knights of S. John, for we find them in possession at the time of the dissolution of the Monasteries. But in a few cases, the efforts of Pope and King seem alike to have been ineffectual in bringing about a transfer to the Hospitallers.

In England, those who had received allowances (*corrodaria*) from the Templars for their lives, on account of services performed or lands granted, on the dissolution of the Order, petitioned the Crown, and received compensation, but no record has been found of such a procedure in Ireland, though it is not unlikely that it took place.

We have now reached the conclusion of the story of the Knights of the Temple in Ireland; but there are one or two matters connected with them which it may be more suitable to mention here than to interpolate in the foregoing narrative.

As has often been the case, the Exchequer of Ireland was drawn upon to assist the needs of the English Exchequer. In 1247, the King commanded the Justiciar to pay 100 marks to the Master of the Temple in England, on account of the 50 marks which he was wont annually to have at the Exchequer of England.³ This annual payment of 50 marks would appear to have been for maintaining a Knight in the Holy Land. In 1252, the Irish Exchequer was again called upon to pay 200 marks, viz., four years' arrears due to the Master of the Temple in England for that purpose.⁴ A more interesting demand, and one of which the results are still remaining, was that of the King in 1243, when he ordered that 500 marks should be paid out of his treasure in Ireland to the Master of the Templars in England, to acquit debts he had incurred in constructing a chapel at the New Temple, London.⁵ This building

¹ Statutes (England), 17 Ed. II, statute 2.

² Papal Registers, vol. ii.

³ Cal. Irish Documents, 1171-1251, No. 2915.

⁴ *Ibid.*, 1252-1284, No. 48.

⁵ *Ibid.*, 1171-1251, No. 2610.

has a particular interest for us, not only because Irish money went to pay for its construction, but because the Irish Master, Walter le Bachelor, was confined there. There is a penitential cell (four feet six inches by two feet six inches) opening upon the stairs leading to the triforium, with slits towards the church, through which the prisoner, unable to lie down, could still hear Mass. In this cell Walter le Bachelor, Master or Grand Preceptor of Ireland, was starved to death for disobedience of the rules of his Order.

I have appended to this paper a schedule of all the lands for which I could find any authority for believing that they at any time belonged to the Templars. But there are many other places in Ireland which tradition or careless historians have attributed to that Order. Of some of these it is impossible, with our limited sources of information, to say whether tradition is right or wrong. It is possible that in some cases lands formerly belonging to the Templars were by them exchanged or assigned to others, and that, whilst any trace of such a proceeding has disappeared, the tradition of their having once possessed them has lingered on. But in other cases, the error has undoubtedly arisen through the confusion in many people's minds between the two Orders of Templars and Hospitallers—a confusion which has been assisted by the fact of many of the lands of the former passing, on their dissolution, to the latter. Of these cases, Kilmainham is a striking example. It is difficult to take up any work dealing with that place without finding the statement that it belonged to the Templars. Archdall is, perhaps, the cause of this error, for in his account of this Priory in his *Monasticon*, he has not only stated that it was given to the Templars by Strongbow, but has mixed up the two Orders in such inextricable confusion, that one can hardly blame others for being unable to disentangle it. The curious point is that he quotes, as his authority, Archbishop King's mss., but on consulting these, I do not find anything to support Archdall's statement. Sir John Gilbert, too, has followed Archdall in his *History of the Viceroy*s; but in his *Historical and Municipal Documents of Ireland*,¹ he quotes from the White Book the contention between the mayor and citizens of Dublin and the Prior of the Hospitallers at Kilmainham in 1261, respecting ground at Kilmainham. From this we learn that the Prior pleaded a charter of Henry II, and at an inquest held by order of the Justices, it was returned that Richard Strongbow in

¹ Page 495.

former times enfeoffed the Prior and his house with all the lands of Kilmainham.

Killergy, County Carlow, is another place which has been associated with the Templars. Ware, in his *Antiquities* (vol. ii, p. 271), says that this preceptory belonged first to the Templars, and then to the Hospitallers. The Abbé MacGeoghegan in his "*Histoire de l'Irlande*," also states that it belonged to the former Order, and passed, on its dissolution, to the latter. That both these authors were wrong, we have a proof in an entry on the Plea Roll 32 Ed. I, where, in the account for County Kildare, we find that Friar Bernard, brother of the Hospital of Kylergi, and Friar Robert, Master of the Hospital of Toly, were fined. A few years before this, viz., in 1290, in the confirmation of a charter from the Prior of the Hospitallers to Henry Marshal, citizen of Dublin, we find the Master of Killergy as a witness.¹ It is extremely unlikely that this preceptory could have belonged once to the Templars and been afterwards transferred by them to the Hospitallers, as the friction between the two Orders was so great as to render such a transaction almost an impossibility.

Killure, County Waterford, is another preceptory which, by various authorities, has been considered as part of the Templars' property. But in Plea Roll 28 Ed. I, m. 8, we find that, in a certain action, Friar Hugh, Preceptor of the house of Killeur, was acting as attorney for the Prior of the Hospital of S. John, which he would not have done if he had been a Templar.

Ballyhook (Balicanok or Ballycaok), County Wexford, is also attributed by some to the Templars, but, I think, without any grounds. In Plea Roll 6 Ed. I (m. 7), Richard de Kalmondesdon, Master of the house of Ballycaok, is associated with the Prior of the Hospital of S. John of Jerusalem in an action against Philip, son of Benedict, and he is also a witness to the confirmation of the charter of the Prior of the Hospitallers in 1290 mentioned above. If any further proof is needed, it may be pointed out that the head of a subsidiary house of the Hospitallers was often called "Master," a term which amongst the Templars in Ireland was only given to the head of the Order, and then not as master of any particular place, but as Master of the Order.

Smith in his "*History of the County and City of Cork*," 1750, states that the preceptory of Mourne (Ballynamony or Monaster de

¹ Cal. Irish Documents, 1285-92. No. 787.

Mona) belonged first to the Knights Templars. However, the Master of Mora, as it was called, was a witness to the above-mentioned deed of the Prior of the Hospitallers; and in the taxation of 1302, the church is entered as belonging to that Order.

It would take a considerable space to enumerate all the places which have been dignified with the appellation of Templars' lands. In some cases, as those mentioned above, the tradition or legend can be proved to be wrong. But in other cases where neither proof nor disproof is forthcoming, we need not contemptuously reject the tradition. Besides the possibilities I have mentioned above of land formerly held by the Templars being exchanged or granted away, there must be many cases where the knights were allowed to hold land free of rent to the lords of the soil, to whom, on the suppression of the Order, the land would naturally revert. As an instance of this, I may cite the lands of Coulmacsaury in County Waterford. Here the Templars held 16 acres of demesne lands from the Bruys family. On account of the minority of the heir, the lands were for some years administered by the Crown; and so we come to have a record of the Templars being settled there, of which otherwise we should have been in complete ignorance.

I have endeavoured in this paper to set out carefully all the known facts about the history of this remarkable Order in Ireland, and by the investigation of hitherto unpublished material to make some addition to our knowledge of Ireland, and especially to the effect in Ireland of one of the greatest, if not the greatest, tragedy of the Middle Ages. Of the published matter which dealt with my subject, I have had to reject much which appeared to me to rest upon no authoritative basis, to say nothing of those statements which I found, on inquiry, to be absolutely devoid of truth. I desire here to express my deep obligations to many friends who have either indicated fresh sources of information or enabled me, by their knowledge, to avoid those numerous pitfalls which are so apt to engulf the unwary historian.

APPENDIX A.

POSSESSIONS OF THE TEMPLARS IN IRELAND.

COUNTY CARLOW.

*Fotherd, Grange of (Forth).*¹—After the dissolution this land was farmed out, at the request of Maud de Clare, Countess of Gloucester

¹ Memoranda Roll, Excheq., 4-5, Ed. II, m. 48 f.

and Hertford, to David de Pembroke.¹ He was killed soon after in the Scottish wars, and the rent due was remitted to his widow by order of the King. In this order the land was called Templeton.²

Rathronan in Fothered (Forth).—Goods worth £37 18s. 2d.; yearly rent of lands, £10 19s. 8d.³

Athkiltan, or Takyltan.—Goods worth £10 8s. 8d.; yearly rent of land, £4 5s. 9d.⁴ The oak-trees from the Templars' woods here were given to Edmund le Botiller to repair the houses at Ballygaveran (Gowran).⁵

COUNTY DUBLIN.

Ballymacorus.—The Templars had some land here, but it is probable that they were only tenants. The Sheriffs accounted for some corn sold and other issues of the Knights to the amount of £4 5s. 2d.⁶

Balyrothery (Balrothery).—Adam Meurwyk paid them a rent here.⁷

Bray.—In the year 1284 we find the following entry amongst the King's rents:—"Rents of Bray—From the Master of the Templars for $\frac{1}{2}$ carucate of land, which he claims to hold by charter, 1 mark; from the same, for a tenement which John Lissebon held, 1 mark; from the same, for the tenement of J. de Howth, 11s. 3d."⁸ In the "Liber Niger" of Archbishop Alan occurs the following deed:—"Williemus filius Johannis Lisbone dedit Deo et Beate Marie et Fratribus Militie templi Salomonis Jerusalemiani in Hibernia totam terram de Clonmore fermoffyn Maghrenlyn et Termagarran et villam de Carrikydan cum omnibus suis pertinentiis et sex acras propinquiores lande de Tirferagh et quandam carrucatum terre juxta terram Domini Archiepiscopi de Shenkyll que vocatur Le Dalgin cum omnibus suis pertinentiis Habendum et tenendum," etc.⁹

¹ Memoranda Roll, Exch., 4-5 Ed. II, m. 2.

² Patent Roll, England, 8 Ed. II, pt. 1, m. 26.

³ Certificate 1 Ed. III (Accounts, etc., Excheq., Q.R. $\frac{2}{13}$ Pub. Rec. Off., London).

⁴ *Ibid.*

⁵ Memoranda Roll, 4-5 Ed. II, m. 48.

⁶ Recepta (Accounts, etc., Excheq., Q.R. $\frac{2}{13}$ Pub. Rec. Off., London).

⁷ *Ibid.*

⁸ Cal. Irish Documents, 1252-1284, p. 560.

⁹ Liber Niger, mss. Trin. Coll., No. 1061, vol. ii., p. 767.

Clontarf, Manor of.—Goods worth £125 17s. 7d.; yearly value lands, £32 10s.¹ These lands were granted to the Templars by Henry II.² Walter, Templar of Clontarf, was a witness to a deed with Giraldus Cambrensis.³ There was a church attached. This manor was granted to Richard de Burgo, Earl of Ulster, 1310,⁴ but was evidently surrendered by him, as it is not to be found in the Inquisition on his estates at his death, and is found amongst the possessions of the Hospitallers at their dissolution.

Dublin.—The Templars possessed some tenements here, perhaps a guest house or houses, as we find arrears of rent due to them from Henry de Waleton, in Dublin, being paid by the nuns of Hogges.⁵

Glenmunder, or Ballyman.—They possessed here “1 castrum, 3 messuagia, 4 cottagia, 100 (acre) arabiles, 60 pasture, 2 prati, 12 subbosei,” valued at £2 0s. 0d.⁶

Killgerger (Killegar).—They held lands here for a short time. See under County Louth (Balibragan). Now in County Wicklow.

Villa Reginaldi (Reynoldstown, Parish of Naul).—When held by the Templars, this land was in County Meath.⁷

COUNTY KILDARE.

Kilcork, Manor of.—Goods worth £24 4s.; yearly value of lands, £25 0s. 4d.⁸ This was afterwards included in the manor of Tully, when it came into the hands of the Hospitallers. See Rathbride.

Monumenoke (Monmohennock, Dunmanogue Parish).—One messuage with the curtilage, five acres of land arable, and one acre of meadow with the appurtenances, up to the water of Gris (river Greese). Passed to the Hospitallers.⁹

Naas.—Some goods of the Templars were found here at the time of their suppression.¹⁰

Rathbride, Manor of.—Now in the parish of Tully. Goods worth

¹ Certificate 1 Ed. III (Accounts, etc., Excheq., Q.R. $\frac{2}{1} \frac{3}{8}$ Pub. Rec. Office, London).

² Cal. Irish Documents, 1285–1292, No. 329.

³ Chartulary of S. Mary's Abbey (Gilbert), vol. i., p. 173.

⁴ Memoranda Roll. Excheq., 4–5 Ed. II, m. 21.

⁵ Recepta (Accounts, etc., Excheq., Q.R. $\frac{2}{1} \frac{3}{8}$ Pub. Rec. Office, London).

⁶ King's mss., vol. xiii.

⁷ Certificate 1 Ed. III, &c.

⁸ *Ibid.*

⁹ King's mss., vol. xiii., p. 85.

¹⁰ Recepta (Accounts, etc., Excheq., Q.R. $\frac{2}{1} \frac{3}{8}$ Pub. Rec. Office, London).

£52 5s. 8d.; yearly value of lands, £31 14s. 4d.¹ Lewis says, in his "Topographical Dictionary," that there are some remains of the ancient religious house, and its chapel still exists. Both the manors of Rathbride and Kilcork were in the hands of the Hospitallers in 11 Ed. II, as in this year the prior was allowed to exchange the manors of Rathbride and Kilcork (excepting the advowsons) for lands in Rathmore.²

COUNTY KILKENNY.

Ballygaveran (Gowran).—Goods worth £23 16s. 10d.; yearly value of lands, 12s. 2d.; church, 50 marks.³ As will be seen by this valuation, the value of the lands was very small, the chief revenue being derived from the church. In 1253 the Templars had a dispute about the advowson of this church.⁴ As recently as 1710 there was a house in Gowran called "the Templars' house."⁵ See County Carlow (Athkiltan).

Kilkenny, Liberties of.—The Knights had some tenants here. In 1328 the lands of Hugh Daudeley, which had been sequestered, were returned to him, except those which had belonged to the Templars.⁶ By Pipe Roll 3 Ed. III, we find that these lands were in the liberties of Kilkenny. I have not been able to trace these lands any further.

Ratheden.—The Templars received some rents from these lands.⁷

COUNTY LIMERICK.

Limerick City.—The Templars had a house here, probably a "frank" house.⁸ See also charter of Limerick.

COUNTY LOUTH.

Balibragan (Braganstown).—This land belonged to the Templars, but they gave it to Nicholas Taafe in exchange for Killergar (Killegar, County Dublin) in 1284. On the Prior of Holy Trinity,

¹ Certificate, 1 Ed. III (Accounts, etc., Excheq., Q. R. $\frac{2,39}{13}$ Pub. Rec. Office, London).

² Patent Roll, 11 Ed. II, m. 115 (Ireland).

³ Certificate 1 Ed. III, &c.

⁴ Cal. Irish Documents, 1252-1284, No. 317.

⁵ Transactions of Kilkenny Archæological Society, vol. iv., p. 92.

⁶ Close Roll, 1328, p. 266 (England).

⁷ Certificate 1 Ed. III, &c.

⁸ Plea Roll, No. 13, m. 45d (18 Ed. I): see also Receipta.

Dublin, claiming Killerger, the Court decided that they were to get back two parts of Balibragan.¹

Coly, Manor of (Cowley).—Goods worth £39 3s. 8d.; yearly value of lands, £40 15s.; and of church at Carlingford, 12 marks.² This manor, containing 40 acres, and the advowson of the church of Carlingford, were granted by Matilda de Lacy to the Master of the Templars. (See Appendix C.) The lands had formerly belonged to O'henrethy, king of that country.

Drogheda.—Some tenements at the yearly value of 3s. 3d., probably their "frank" house.³

Kilsaran, Manor of.—Goods worth £42 14s. 8½d.; yearly value of lands, £11 15s. 6d.⁴ MacGeoghegan says it was founded by Matilda de Lacy.⁵ Ware says that it was founded in the twelfth century.⁶ There were also the following churches attached, viz.:—Kilsaran, 16 marks yearly value; Molaury (Mullary), 14 marks; Portlyneran (Port), 100 shillings; Keppoe (Cappoge), 10 marks; villa Gernon (Gernonstown), 5 marks; Kilmedymok (Kildemoch), 10 pounds; Talonneston (Tallanstown), 6 marks; Kiltanelagh (Kiltallaght), 20 shillings; Cresmartyn (Crowmartin in Clonkeen), 1 mark; Kilpatrick in Kildemoch, 2 marks; Droghestroll (Philipstown); Moymok (not valued because "inter Hibernicos"); and the tithes of the following churches⁷:—Rocheston (Roche), Atherde (Ardee), Archerstown (Arthurstown), Larblester, Dofnany (Dunany), Maynbraddath and Maynath (Mayne), and Drogheda. It is interesting to read a letter from Capt. R. Perkins, writing from Newry to Col. E. Mathew as late as 14th September, 1645, in which he says:—"According unto your directions I went to Kilsaran, and I find seventeen parishes belonging to that preceptory."⁸ This manor was granted to Richard de Burgo, Earl of Ulster,⁹ 1310, but was evidently surrendered by him, as it is not to be found in the Inquisition on his estates at his death, and is found amongst the Hospitallers' possessions at their dissolution.

¹ Plea Roll No. 16, m. 14 (19 Ed. I).

² Certificate 1 Ed. III (Accounts, etc., Excheq., Q.R. 2₁3₃^o. Pub. Rec. Office, London).

³ *Ibid.*

⁴ *Ibid.*

⁵ MacGeoghegan: "Histoire de l'Irlande," vol. ii., p. 60.

⁶ Ware's "Antiquities," vol. ii., p. 271.

⁷ Plea Roll No. 68, m. 29d (32 Ed. I).

⁸ Ormond mss., new series, vol. i., p. 96.

⁹ Memoranda Roll, Excheq., 4-5 Ed. II, m. 21.

COUNTY MEATH.

Haukyneston (Hawkinstown, par. Piercetown).—The Templars received some rents here.¹

Hogge Bretteston (Hodgestown, in Stamullen).—Here they had 4 acres of land, for which, at the time of their suppression, they were receiving half a mark yearly from Walter de Bret, of Tolok.²

Hylleton juxta Lekno (Hilltown, near Piercetownlandy).—They had some tenements here, let to Thomas Page, of Drogheda, from whom they received 5 marks rent. This land was formerly in the County of Trim.

COUNTY SLIGO.

Teachtemple, or Templehouse.—Goods worth 73s. 8d.; yearly value of lands, 40s.; one church, 40s.³ This preceptory was called Loghnehely in the certificate of 1 Ed. III. It obtained this name from the lake Lough Awnally (Ath-angaile). In the Annals of Loch Cé the castle of Tech Temple is mentioned (1270), and Templehouse is its modern name. In the taxation of 1302–6 the vicarage was called Kellecath, and corresponded to the modern parish of Kilvarnet. On the suppression of the Templars, it passed to the priory of S. John of Randown, which is stated to have held 16 quarters of land here, and the rectory and tithes.⁴ Archdeacon O'Rorke contends that the castle was built by MacWilliam Burke in 1262; but he is certainly wrong in stating that the Templars had no possessions here.⁵

COUNTY TIPPERARY.

Ballyscarva, or Ballystarna (? Scornan, now Graystown).—David, Archbishop of Cashel, was defeated by the Master of the Templars in a claim to the advowson of this chapel, and fined £100, which was, in 1274–5, reduced to £50.⁶

¹ Recepta (Accounts, &c., Excheq., Q.R. $\frac{2}{1} \frac{3}{3} \frac{9}{9}$ Pub. Rec. Office, London).

² Certificate, 1 Ed. III (Accounts, Excheq., Q.R. $\frac{2}{1} \frac{3}{3} \frac{9}{9}$ Pub. Rec. Office, London).

³ *Ibid.*

⁴ Knox, "Notes on the Diocese of Tuam, &c.," p. 301.

⁵ Archdeacon O'Rorke's "History of Sligo," vol. ii., pp. 73–80.

⁶ Cal. Irish Documents, 1252–1284, No. 1086.

Clonaul, Manor of (Clonoulty).—Goods worth £161 6s. 9d. ; yearly value of lands, £47 1s. 11d. ; also the following churches: Ardmayle (Ardmail), £20; Ballyshechan (Ballyschean), £10; Kilmacloy (?Kilmoyler), 4 marks; and Clonaul, 20s.¹ The Prior of Athassel and the Master of the Templars were at law about the right to the advowson of Ardmayle at the time of the suppression of the Order.² This church (and Ballyshean) escheated to the Crown, in right of the Templars. They also possessed property at Villa Petri and Rathconewy.³

COUNTY WATERFORD.

Athmethan (Affane).—They possessed here one messuage, with buildings, lands, and tenements.⁴

Crook, Manor of.—Goods worth £32 10s. ; yearly value of lands, £20 13s. 4d. ; and church, 40s.⁵ This manor was granted to the Templars by Henry II, and confirmed by three successive kings.⁶ This is where Henry II landed on his arrival in Ireland, 1172. It was about 5 carucates of land in this manor that the famous case with the Abbot of Dunbrody occurred.

Coulmaksawery (Coul m'saury).—They appear to have been tenants here of the Bruys family. They occupied 16 acres of demesne land, value 2s. per an.⁷

Dunmore.—They had some rents here.⁸

Kilbarry, Manor of.—Goods worth £56 6s. ; yearly value of lands, £38 5s. 5d. , and a church, 13s. 4d.⁹ These lands are situate one mile south of Waterford, and there are still ruins existing. They were granted by charter of Henry II.¹⁰ The Templars were afterwards granted a lease by John de Monfichet of Kareggenard (Carriganard) and

¹ Certificate 1 Ed. III (Accounts, &c., Excheq., Q.R. $\frac{2}{13}$ Pub. Record Office, London).

² Justiciary Roll, 35 Ed. I, m. 52. The Master said it had been given to the Order in the time of Herbert of Manchester.

³ Certificate 1 Ed. III, &c.

⁴ Memoranda Roll, Excheq., 6-7 Ed. II, m. 52.

⁵ Certificate 1 Ed. III, &c.

⁶ Cal. Irish Documents, 1285-1292, No. 329.

⁷ Pipe Roll, Excheq., 12 Ed. II (No. 45).

⁸ Certificate 1 Ed. III, &c.

⁹ *Ibid.*

¹⁰ Cal. Irish Documents, 1285-1292, No. 329.

Karengnor (? Carrigroe), on payment of 5 marks yearly to him, and a pair of furred gloves or 2 shillings to the Crown.¹ All these lands passed to the Hospitallers, probably in 1320, as we find the Templars debited with this payment of gloves up to about this period, and in 1322 we find the Hospitallers owing 2 years' rent of gloves.²

Ky[]th.—On the roll of Irish Exchequer Accounts for 1298–9 it is mentioned that these lands belonged to the Templars, for which they paid 12*d.* yearly to the Crown. They are referred to in an extent of the lands of Thomas fitzMaurice. Unfortunately, portion of the name is illegible.³

Rathmarorkain.—These lands were granted by Reginald de Crobisbie to the Templars, and by them afterwards to S. Mary's Abbey (1273).⁴

Waterford.—Mills on the waters near Waterford, called Polwaterfoure and Innermictam, and a small marsh near Waterford, between the King's houses and the sea, were granted to the Templars by Henry II.⁵ They also possessed the island close to the city, worth one mark a year,⁶ and probably a house in Waterford.

COUNTY WEXFORD.

Kilbride.—The Templars laid claim to these lands against the Abbot of Dunbrody, but withdrew their claim. The matter, however, continued in doubt for some time, as, after the suppression of the Order, the Crown entered into possession as their heirs. Ultimately the Crown retired, and the Hospitallers gave the Abbot a quit-claim from any demand by them.⁷ We know that the Templars did at some time possess these lands, as John Romayn was admitted into the Order here by the Master.

Kilclogan, Manor of.—Goods worth £140 3*s.* 6*d.*; yearly value of lands, £45 11*s.* They also possessed the church of Mythelnagh (Meelnagh), value 24*s.*, and a moiety of tithes of 3 carucates of land belonging

¹ Chartularies (Wood), 10 fol. 8^b. Bodleian, Oxford. These lands had formerly belonged to Ballyman Cutel, who was probably a Dane.

² Pipe Roll, Excheq., 16 Ed. II, m. 5.

³ Cal. Irish Documents, 1293–1301, p. 263.

⁴ Chartulary of S. Mary's Abbey (Gilbert), vol. ii., p. 7.

⁵ Cal. Irish Documents, 1285–1292, No. 329.

⁶ Recepta (Accounts, &c., Excheq., Q.R. 2₁₃⁹. Pub. Rec. Office, London).

⁷ See Chartulary of S. Mary's Abbey, vol. ii., pp. lxxxv–vii.

to the church of Killiwryn (Killurin), worth 20s.¹ This preceptory is said by MacGeoghegan to have been founded for the Templars by the O'Morras.² The church of Kilclogan (value 20 marks) is probably Templetown, as this was included in the manor, and the tower of Templetown church, in the Early English style, about half a mile from the castle of Kilclogan, still exists.³ This manor was retained for some years for the support of the Templars when imprisoned in Dublin Castle.

Wexford.—Henry II granted to the Templars mills in Wexford, also the church of S. Alloch (or S. Waloch) near Wexford, with the land belonging thereto, and Agnile (or Agmile), burgess of Wexford, with all his chattels.⁴ Mr. McEnery considers that the church of S. Alloch is the church of S. Michael, Wexford.

Villa Monachi.—A commission was granted to David de Borard to farm these lands, when they came into the King's hands, in 1313. I have been unable to identify them.⁵

COUNTY WICKLOW.

Kilpool.—On the south side of Wicklow, near the sea.⁶ At the time when this church was held by the Templars, it was in the County of Dublin.

APPENDIX B.

INVENTORY OF THE GOODS, LANDS, AND CHURCHES BELONGING TO THE PRECEPTORY OF CLONAU, COUNTY TIPPERARY.⁷

Certificacio Thesaurarii et Baronum de Scaccario Dublin', pretextu brevis domini Regis sibi directi huic consuti.

Clonaul.—Scrutatis eciam Rotulis et memorandis supradictis Compertum est quod predicto tercio die Februarii inuenta fuerunt in

¹ Certificate 1 Ed. III (Accounts, &c., Excheq., Q.R. $\frac{2}{1} \frac{3}{3}$ Pub. Rec. Office, London).

² MacGeoghegan, "L'Histoire de l'Irlande," vol. ii., p. 60.

³ See Hore's "History of County Wexford," s.v. Kilclogan.

⁴ Cal. Irish Documents, 1285-1292, No. 329.

⁵ Memoranda Roll, Excheq., 6-7 Ed. II, m. 37.

⁶ Crede Mihi, p. 143.

⁷ Certificate 1 Ed. III (Accounts, &c., Excheq., Q.R. $\frac{2}{1} \frac{3}{3}$ Pub. Rec. Office, London).

manerio predictorum Templariorum apud Clonaul in Comitatu Typerar⁷ bona et catalla infra scripta videlicet vnus Palefridus albus precii x marcarum Item alius Palefridus fauus precii xls. Item vnus equus bar' cum oculis et superciliis albis precii v marcarum Item quartus equus vetus stalonus ad equituram cum quodam pede albo precii xls. Item vnus equus somerius niger precii v marcarum. Item alius somerius doyn¹ precii xiiij s. iij d. Item Preceptor ibidem habuit vnum equum Rubeum precii i marce. Item xx affri² debiles precii cuiuslibet iij s. Item tres pulli sequentes affros illos precii cuiuslibet xx d. Item in equicio xvj Juuenta³ precii cuiuslibet dimidii marce. Item vnus pullus⁴ masculus de duobus annis precii iij s. Item duo pulli masculi et duo femelli de etate vnus anni precii cuiuslibet xl d. Item duo pulli masculi et duo femelli vnus anni precii cuiuslibet ij s. Item lvij boues precii cuiuslibet iij s. Item viginti vacce et vnus Taurus precii cuiuslibet iij s. Item duo bouiculi duorum annorum precii cuiuslibet ij s. Item quinque Juente⁵ duorum annorum precii cuiuslibet ij s. Item octo bouetti de uno anno precii cuiuslibet xx d. Item xij vituli vnus anni precii cuiuslibet xvj d. Item xxix porci precii cuiuslibet viij d. Item xiiij^{xx} et x multones precii cuiuslibet vj d. Item xiiij^{xx} et ij oves matrices precii cuiuslibet vj d. Item viginti quarteria de carnibus bouinis precii cuiuslibet viij d. Item xij bacones precii cuiuslibet ij s. Item quatuor multones precii cuiuslibet vj d. Item in Grangia ibidem xxxvj crannoci⁶ auenarum per estimacionem in garbis precii crannoci v s. Item vnus Tassus decime in Hagardo de diverso blado precii iij marcarum. Item apud villam Petri in Grangia xxvj crannoci auenarum p estimacionem in garbis precii cuiuslibet crannoci v s. Item vnus tassus auenarum continens xvj crannocos de montana⁷ per estimacionem precii cuiuslibet crannoci xl d. Item vnus Tassus frumenti et alius auenarum ibidem de decimis de Ardmayl precii cuiuslibet tassi v marcarum. Item apud Balyshean in grangia per estimacionem x crannoci frumenti precii

¹ Dun-coloured.

² Afers, plough-horses.

³ This should be Jumenta = brood-mares.

⁴ Colts.

⁵ This should be Juvence = heifers.

⁶ A measure of corn prevalent in Ireland to the end of the fourteenth century. Its value varied, according to different authorities, from half a quarter to two quarters.

⁷ This may have been a special measure, used up in the hills, and of a smaller size than that used in the plains, as may be inferred from the difference in price.

cuiuslibet crannoci *v s.* Item xvij crannoci auenarum precii cuiuslibet crannoci *v s.* Item apud Rathconewy vnus tassus de diuerso blado decime precii iij marcarum. Et in granario de instauro¹ domus predictae iij^{or} crannoci de maceto² auenarum precii cuiuslibet crannoci *v s.* Item fuerunt ibidem *v^{xx}* acre frumenti seminate precii cuiuslibet acre *xl d.* Item xv acre auenarum precii cuiuslibet acre *ij s.* Item apud villam Petri iij^{xx} et x acre frumenti precii cuiuslibet acre *xl d.* Item ibidem x acre auenarum precii cuiuslibet acre *ij s.* Item vnum lauatorium³ precii viij *d.* Item tres olle enee debiles precii *x s.* Item due patelle enee precii vnus *ij s.* precii alterius *ij s.* Item vna craticula⁴ precii iij *d.* Item vnum micatorium⁵ precii *ij d.* Item vnus cultellus de coquina precii *ij d.* Item duo cacabi⁶ precii vnus dimidii marce precii alterius *xl s.* Item duo possineti orrei⁷ precii vnus *ij s.* et precii alterius *xij d.* Item in fabrica vna cudis⁸ precii *xl d.* Item in pistrina *v* cupe precii *v s.* Item due trendelle⁹ precii *xvj d.* Item *ij* modelli¹⁰ precii *xvij d.* Item vnus magnus modellus precii *ij s.* Item duo dolei precii *ij s.* Item sex pipe precii cuiuslibet *vj d.* Item vnus modellus in lardatorio precii *xij d.* Item in aula tres mense. Item in Camera tres veteres cofres precii *xx d.* Item vna Crowe de ferro ad frangendum lapides que appreciatur ad *ij s.* Item *vij* libri et *x s.* argenti. Item quinque Ciphi argentei pondus cuiuslibet *j* marca. Item vnus Ciphus argentei cum vno coopertorio vnde pondus Ciphi *j* marca *ij d.* et pondus coopertorii *vj s.* *ij d.* Item vnum lauatorium argenteum ponderis *xix s.* *vij d.* Item duodecim coclearia argentea ponderis *x s.* *v d.* Item vnus mazerus¹¹ precii *iiij s.* Item duo peria coopertorium¹² de telo precii vnus cum cerico cooperti *j* marca et precii alterius *vij s.* Item lectus magistri cum robis suis et cofris et lecti et robe duorum fratrum que non appreciabantur set tradebantur in custodia sui camerarii. Item septem caruce cum ferramentis et alio apparatu precii cuiuslibet *ij s.* Item tria peria rotarum pro bigis precii *ij s.* Item duo peria rotarum pro carectis precii *ij s.*

Que quidem bona et catella in presencia fratris Willielmi de Wareyne custodis domus predictae coram Nigello le Bruyn tunc Escaetore Hibernie per sacramentum fidedignorum appreciata in forma

¹ The stock.² Malt.³ A ewer.⁴ Gridiron.⁵ A grinder or grater.⁶ Caldrons.⁷ Barn-skillet; saucepan used in the barn.⁸ Anvil.⁹ Trundles or trucks.¹⁰ Large vessels.¹¹ A cup made of a wood of mottled grain.¹² Coverings of some woven material, one being lined with silk.

predicta predicto tercio die Februarii per eundem Escaetorem capta fuerunt in manum prefati domini Edwardi Regis patris, &c., et tradita Ricardo Blanchard et Johanni Cod custodienda preter blada apud Balyschean que tradebantur Radulpho Clerico custodienda. Et preter vnum tassum bladi apud Rathconwy qui tradebatur Johanni Barec custodienda et postea per prefatum Thesaurarium commissa fuerunt xxviiij die Junii anno regis prefati patris primo Edmundo le Botiller.

Summa bonorum appreciatorum . . . clxj *li* vj *s.* ix *d.*

Postea per Johannem Wogan tunc Justiciarium et prefatum Thesaurarium Hiberniae liberata fuerunt Edmundo le Botiller ad opus prefati Fratris Williemi Wareyne de bonis predictis vnum lauatorium argenteum ponderis xix *s.* viij *d.* duo cipi argenti ponderis ij marcarum vnum coopertorium argenti ponderis vj *s.* iij *d.* et duodecim coclearia argenti ponderis x *s.* v *d.*

Terrae ibidem.—Compertum est eciam quod terre redditus et tenementa que fuerunt dictorum Templariorum in manerio predicto que extendebantur per annum ad xlviij *li.* xxiiij *d.* coram prefato Nigello le Bruyn Escaetorem Hiberniae capta fuerunt in manum prefati domini Edwardi Regis patris, &c., per eundem Escaetorem et tradita Galfrido de Burgo et Henrico Hakett custodienda in forma predicta Et postea per prefatum Thesaurarium commissa fuerunt xxviiij^o die Junii anno regis prefati patris primo Edmundo le Botiller per extentam eorundem.

Summa extente terrarum ibidem per annum—xlviij *li.* xxiiij *d.*

Ecclesie ibidem.—Compertum est eciam quod predicti Templarii habuerunt ibidem in proprios usus Ecclesias subscriptas videlicet,

Ecclesiam de Ardmayl que extenditur per annum ad xx *li.*

Item Ecclesiam de Balyschean que extenditur per annum ad x *li.*

Item Ecclesiam de Kylmacloy que extenditur per annum ad iiiij marcas.

Item Ecclesiam de Clonaul que extenditur per annum ad xx *s.*

Summa valoris ecclesiarum per annum xxxiiij *li.* xiiij *s.* iiiij *d.*

Que quidem Ecclesie per ipsum Thesaurarium per commissionem domini Regis sub sigillo scaccarii predicti v^{to} die Junii anno regni prefati Regis patris secundo tradita fuerunt Ricardo de Wodehous per extentam earundem. Qui eas tenuit vsque x^m diem Augusti anno regni eiusdem Regis sexto quo die consimili modo eadem ecclesie tradite fuerunt Thomae le Botiller tenende in forma predicta sic compertum est per rotulos maneriorum scaccarii supradicti.

Compertum est eciam quod debebantur predicto die prefatis Templariis ibidem debita subscripta videlicet—

Johannes Cod pro vno tasso auene sibi vendito apud Ardmayl—viij marce.

Summa debitorum patet.

APPENDIX C.

GRANT OF THE MANOR OF COLY AND ADVOWSON OF THE CHURCH OF CARLINGFORD, BY MATILDA DE LACY TO THE TEMPLARS IN IRELAND.¹

Omnibus Christi fidelibus presentes litteras visuris uel audituris Matillda de lacy salutem in domino eternam. Noverit vniversitas vestra me in pura et libera viduitate mea pro salute anime mee et animarum patris et matris mee et omnium antecessorum et successorum meorum necnon et anime Davidi baronis de Naas quondam viri mei dedisse concessisse et hac presenti carta mea confirmasse deo et beate Marie et fratribus milicie templi Jerosolimitani in hibernia quadraginta acras terre cum pertinenciis in Coly quas Ohenrethy Rex patrie illius quondam tenuit vna cum aduocacione tocius ecclesie de Carlingford et tocius tenementi mei de Coly tenendas et habendas predictis fratribus milicie templi et eorum successoribus in liberam puram et perpetuam elemosinam cum omnibus pertinenciis suis libertatibus et liberis consuetudinibus ad predictas quadraginta acras et aduocacionem ecclesie predictae pertinentibus adeo libere quiete sicut altera elemosina alicui domui religionis melius plenius et liberius conferi poterit libere quiete et solute ab omni seculari servicio exaccione et demanda. Et ego predicta Matillda et heredes mei predictas quadraginta acras terre vna cum aduocacione tocius ecclesie predictae cum omnibus pertinenciis suis predictis fratribus milicie templi et eorum successoribus vt meam liberam puram et perpetuam elemosinam contra omnes homines et feminas Warantizabimus defendemus et acquietabimus imperpetuum vt autem hec mea donacio concessio et presentis carte mee confirmacio rata et stabilis imperpetuum permaneat presenti scripto sigillum meum duxi apponendum hiis testibus Domino Henrico de Hadeleye, domino Gilberto de Repentney, domino Ricardo de Heddesovere, domino Ade de Stanle, domino Willielmo Talun, domino Simone de Clynton, domino Johanni Malet, Henrico de Saule, Ricardo ffulstawe, Rogero Gernu miles fil'oun, Roberto fil'miles Johanni de Coly et aliis.

¹ Plea Roll No. 64 (30 Ed. I, m. 19).

APPENDIX D.

DEATH AND BURIAL OF WALTER LE BACHELER.¹

Fr' Johannes de Stoke de ordine Templi capellanus . . . Interrogatus super modum mortis seu occasionis fratris Walteri Bacheler, militis Templi, et super modo sepulturae, et super receptione confessionis, et aliorum sacramentorum et infirmitate de qua decessit; respondit, quod fuit sepultus sicut alius christianus, excepto quod non fuit sepultus in coemeterio, sed in platea domus London', et quod fuit confessus fratri Richardo de Grafton, presbytero, qui est in Cypro, et credit quod receperit corpus Christi licet nesciat; et dicit, quod ipse et frater Radulphus de Barton, qui est in turri London', portarunt ipsum ad sepeliendum in aurora, et fuit in carcere, ut credit, per octo septimanas. Interrogatus, an fuit sepultus in habitu, respondit, quod non. Interrogatus, quare fuit sepultus extra coemeterium; respondit, quia reputabatur excommunicatus. Interrogatus, a quo fuit excommunicatus; respondit, quod credit quod ex statuto vel ordinatione communi, quae erat enter eos, quod quicumque furtive surriperet bona domus, et non recognosceret, reputabatur excommunicatus. . . .

APPENDIX E.

MEMORANDA OF SOME INCOMPLETE ENTRIES AND UNIDENTIFIED PLACES
IN CONNEXION WITH THE TEMPLARS.

(No date.) Brother Henry Foliot, Master of the Knighthood of the Temple in Ireland, and the brethren of Clontarf. (Cal. S. Mary's Abbey, vol. ii, p. 12.)

1238. Geoffrey de Marisco attorns Nicholas le Clerc against Brother Roger, Master of the Templars in Ireland, touching a warranty of charter of tenements in Meawy. (Cal. Irish Documents, 1171-1251, No. 2462.)

1241. Mandate to the Justiciar of Ireland regarding the record of a plaint summoned before him by the King's writ, between Roger Walensis, Master of the Templars in Ireland, plaintiff, and Matilda de Marisco, deforciant, of 4 carucates of land in Stachnach. (Cal. Irish Documents, 1171-1251. No. 2528.)

¹ Wilkins' "Concilia," vol. ii., p. 346.

In the Guildhall of the City of Dublin. Brother Herbert, Master of the Templars in Ireland, puts in his place Roger de Cumbre or William fitzNicholas, against Roger de Frarendun, and Alice, his wife, of a plea of warranty of a deed. (Plea Roll, 45 Henry III.)

Waterford, before Justices itinerant. The Master of the Templars against Reginald Lunel, of a plea of land. (Plea Roll, 45 Henry III.)

The Abbot of Dunbrody charges Brother Robert of Glastonbury, Master of the Templars in Ireland, of unjustly disseising him of his free tenement in Baligone, Baligurthath, Kilmacluyth, Rothclon, Gurtynlathelyn, Lachelyneswode, Collamigsy, and Colanesboly, viz., $4\frac{1}{2}$ carucates of land. A jury of men of the cross of Ossory and Leighlin ordered to be impanelled. No further proceedings known. (Plea Roll, 6 Ed. I, m. 10.)

Louth. A day is given to the Master of the Templars in Ireland, and to the Archbishop of Armagh, John Gernoun, and other attorneys, of a plea of trespass. (Plea Roll No. 29, 25 Ed. I, m. 14 d.)

Brother Henry de Aslabeby, general attorney of Walter Bachelor, Master of the Templars in Ireland, puts in the place of the said Walter, William Makepays or John de Coventre, against the Abbot of Saint Mary, near Dublin, "de audiendo recordo," etc. (Plea Roll No. 29, 25 Ed. I, m. 34.)

Brother Peter de Malvern, Master of the Templars in Ireland puts in his place Richard the Clerk of Croke, against Brother Philip de Troye, Abbot of Saint Mary, near Dublin, of a plea of land. (Plea Roll, 28 Ed. I.)

Brother William de Warren, Master of the Templars in Ireland, against the King, of a plea of *quo warranto* by John de Appelby. (Plea Roll, 35 Ed. I, m. 13.)



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Brother William de Warren, Master of the Templars in Ireland, against the King, of a plea of *quo warranto* by John de Appelby, (Plea Roll, 35 Ed. I, m. 13.)

XV.

AN UNPUBLISHED ASTRONOMICAL TREATISE BY THE
IRISH MONK DICUIL.

EDITED, WITH AN INTRODUCTION, BY MARIO ESPOSITO.

PLATE XXII.

Read APRIL 22. Ordered for Publication APRIL 24. Published AUGUST 6, 1907.

NOTE.

VERY little is known about the Irish monk Dicuil. He wrote a short geographical tract in the year 825 A.D., which has been published twice in France and once in Germany, and is of considerable importance, as it contains a record of the discovery of Iceland by Irish monks at least sixty-five years before the arrival of the Scandinavians in that island. The existence of an unpublished astronomical work by the same author was pointed out for the first time in 1879 by a German scholar, Ernest Dümmler, who discovered it in a ninth-century ms., in the public library of Valenciennes in France. The ms. is a beautifully written one, with illuminations, and was obtained from the ancient abbey of St. Amand in Flanders. It was brought to the Valenciennes library at the time of the French Revolution. This treatise, of which I have prepared a text-edition, was incorrectly attributed to Alcuin by the authors of the catalogue of the Valenciennes library; but the author has given us his own name in several passages. It is divided into four books, and was written, as Dicuil himself tells us, in the years 814–816 A.D., when he was teaching in one of the schools of the King of the Franks, Louis le Débonnaire, to whom the work is dedicated.

The four books are written in Latin in a peculiar mixture of prose and verse, and treat in the main of astronomical matters. Incidentally grammatical and metrical questions are touched upon.

The only authors quoted by name are Pythagoras and the grammarian Donatus. Among other things, the treatise contains rules for finding what month it is, counting from April, and what day of the month, what the moon's age is, and what days Easter and the beginning of Lent fall upon. The great cycles of the

sun and moon, the lunar cycle of nineteen years, the cycles of the stars, and also the length of the solar and lunar years, are discussed. At the beginning of the second book there is an account of the distances between heaven and earth, and between the seven planets, where some curious figures are given, though we are not told how these numbers were arrived at.

At the end of the last book there are some curious speculations about the existence of a south polar star, and about the revolutions of the planets. Here Dicuil shows that critical spirit, so rare in the ninth century, which has excited the surprise and admiration of the commentators of his geographical tract. Thus in explaining the apparent motion of the sun and stars according to the theory then adopted, he notices its unsatisfactory nature, and remarks that if anyone would give him a better solution of the problem, he would gladly adopt it. In another place he unfortunately omits to discuss the influence of the moon on the tides, because, as he remarks, he was then living far away from the sea, and would leave that matter to those dwelling on the coast.

Among the most remarkable things in the treatise are the sets of sixteen-syllable rhyming couplets at the end of the first book, which attracted the special attention of the German scholar Dümmler, the discoverer of the work. Students of medieval Latinity—a subject now-a-days of such importance that chairs of it have been established at several German Universities, notably at Berlin, Göttingen, and Munich—will find these verses, and also the discussion on metre and how to write certain kinds of poetry, highly interesting. To the historian of astronomy the treatise is all the more valuable from the fact that we have very few medieval works on astronomy, written in western Europe, and because it gives a succinct account of practically all that was known on the subject in the ninth century. Most of Dicuil's information seems to be derived from his own personal knowledge of the calculations employed by the Churches of Ireland, England, and France in regulating the Calendar for the observance of the various religious festivals. It is possible that he also got some information from such works as the "Cursus Paschalis" of Victorius of Aquitaine, recently published by Mommsen in his *Chronica Minora*.

In conclusion, I may say that the whole work is full of interesting and curious information, and it is certainly surprising that it has never yet been published. It is important not only to the historian of medieval science and to the student of medieval Latinity, but also as a monument of Irish learning in the ninth century.

PRAEFATIO.

LIBER ineditus de astronomia, a Dicuilo monacho Hibernico annis post Chr. n. 814–816 conscriptus, Hludowico Pio dedicatus, primum in codice No. 386 bibliothecae Valentianensis ab Ernesto Duemmlero repertus est, qui brevem eius notitiam dedit in commentatione de reliquiis manuscriptis poetarum aevi Carolini.¹

Auctor catalogi bibliothecae Valentianensis, Mangeartus,² cum Sanderus³ atque editoribus historiae litterariae Galliae⁴ Alcuino librum attribuerunt, sed versus sequentes,

“Dicuil haec ego quae feci argumenta”⁵

“Dicuil haec ego quae feci ioca”⁶

satis Dicuilum auctorem fuisse demonstrant. Hibernicum fuisse quoque haec verba docent, “*mea gens in Hibernia.*”⁷

Praeter librum de astronomia composuit libellum de mensura orbis terrae anno 825, epistolam versusque de arte grammatica,⁸ de quibus omnibus in nova libri cosmographici editione disseram.

Codex Valentianensis, N. 4. 43 (No. 386 catalogi Mangearti), olim antiquae bibliothecae coenobii S. Amandi, N. 247,⁹ membranaceus, litteris minusculis, saeculo nono exeunte, scriptus, 118 foliis constat.

ff. 1–26 : Liber Ysidori de Rethorica et Dialectica.

ff. 27–56 : Disputatio de Rethorica et de Virtutibus Regis Karoli et Magistri Albini.

fo. 57 r° : Sententiae Septem Sapientium.

ff. 57–62 : Philosophia Theorica, Practica, et Logica, cum prologo Origenis de Cantico Cantorum.

ff. 62–65 r° : Dicta seu Prophetia Sybillae Magae.

fo. 65 v° : Versus Sybillae de die iudicii.

ff. 66–118 : Dicuili Liber de Astronomia. In hac editione fere

¹ Neues Archiv der Gesellschaft für ältere Deutsche Geschichtskunde, 1879, Band iv, pp. 256 sqq.

² Catalogue des mss. de la Bibliothèque de Valenciennes, Paris, 1860, pp. 375 sqq.

³ Bibliotheca Belgica mss., Insulis 1641, Pars I, p. 54.

⁴ Histoire Littéraire de la France, tome vi, 1742, pp. ix, x.

⁵ De Astronomia I, cap. vi, 5, huius editionis.

⁶ Loc. cit., cap. viii, 5.

⁷ Loc. cit., cap. v, 2.

⁸ Vide Letronne, Recherches sur Dicuil, etc., 1814; Ebert, Literatur des Mittelalters, Band ii, 1880, pp. 392–4; Dümmler, Poetae Latini Aevi Carolini, tom. ii, 1884, pp. 666–668.

⁹ Sanderus, loc. cit., p. 54.

semper codicis orthographiam secutus sum,¹ quare conservanda putavi pasca et pascha, decennovennalis et decennovenalis, ymnus, ciclus, Aprelis, etc.

In libro astronomico citantur modo a Dicuilo² Donatus, Pythagoras et “philosophi.” Praeter Dicuilum complures fuerunt Hibernici, qui de astronomia scripserunt, inter quos memorabo Columbanum, Virgilium Salisburgensem, Dungalum, Marianum Scottum.³

DICUILI

LIBER DE ASTRONOMIA

Capitula primi libelli incipiunt.

- I. Quotus mensis sit ab Apreli.
- II. De contrariis regulis quae possunt non esse.
- III. De contrariis regulis quae non possunt abesse.
- IV. Quotus sit dies mensis.
- V. De contrariis regulis semper manentibus.
- VI. De crescenti numero et per semet multiplicato.
- VII. De duobus ciclis decennovenalibus.
- VIII. De ludificis versibus.
- IX. De ymno per rythmum facto.

Capitula secundi libelli.

- I. Quantum dicunt philosophi spatium inter terram et caelum, et quanta intervalla inter errantia sidera septem.
- II. Quotus mensis lunaris sit a pascale luna.
- III. De contrariis regulis.
- IV. Quotus mensis lunaris sit aliter exploratus.
- V. Quota sit aetas lunae.
- VI. Quota sit aetas lunae aliter explorata.
- VII. Ymnus per rythmum factus.
- VIII. Versus docentes pascales regulas ac regulas initii quadragesimae.

¹ Vide Letronne, *Recherches sur Dicuil*, pp. i-ii.

² I, cap. viii, 5; II, cap. i, 1, 4; IV, cap. vi, 2, 3; cap. vii, 5, etc.

³ Vide Houzeau et Lancaster, *Bibliographie de l'Astronomie*, tome i^{er}, 1887-89, pp. 502, 1401, 1448. De astronomica scientia aevi Carolini vide Cantor, *Vorlesungen über Geschichte der Mathematik*, 1894, Band i, pp. 781-790; Sickel, *Sitzungsberichte der Wiener Akademie, Philosoph.-Histor. Klasse* 1875, 38, p. 153; Mommsen, *Chronica Minora*, 1892 sqq., passim; *Annals of Ulster*, vol. iv, 1901, pp. xiv-clxxx.

- VIII. De bissexto et saltu aliquando turbantibus, aliquando non turbantibus communes regulas inter initium quadragesimae et pasca.
- X. De locis bissexti ac saltus.
- XI. De annis solaribus atque lunaribus.
- XII. De ciclis qui sunt et qui non sunt, et si fuissent quanta longitudine fuissent.
- XIII. De ludificis versibus.
- XIII. De ymno per rythmum facto.

Capitula tertii libelli.

- I. De ciclis stellarum.
- II. De ciclo decennovenalium.
- III. De ciclo magno solis ac lunae capitula xiii.
- III. De primo die naturaliter anni.

Capitula quarti libelli.

- I. De bissexto solari.
- II. De saltu lunari.¹
- III. De saltu lunari.
- III. De bissexto lunari verissime.
- V. De tarditate lunae post celerem solem.
- VI. De tarditate solis post stellas veloces.
- VII. De diebus et momentis ac partibus momentorum, in quibus sol transit in hereditatem sideream tantum spatii quantum luna in uno die intrat.

Menstrua si cupias hic argumenta videbis.

LIBELLUS PRIMUS.

CAP. I.

1. Nunc genitum Carolo volo dilectare loquendo,
 Perludum faciens illi argumenta canendo.
 Ecce quotus mensis si vis haec scire memento,
 Prorsus ab Apreli incipiens ita iura probare.
 De quibus ulla prius nunquam argumenta fuere.

DE MENSE APRELI.

2. Si quotus mensis est ab Apreli, argumentando intellegere volueris,
 a Kalendis eiusdem Aprelis, lunari saltu completo, denas epactas lunae

habentibus, principium cœli huius rationis semper incipe, ac epactas vigesimi quinti diei præcedentis mensis Martii. Sed ita e contrario retrorsum conversas, ut fiunt primæ novissimæ et novissimæ primæque, sic infra hoc ordine scribuntur prævide: xxi, x, xxviii, xviii, vii, xxvi, xv, iiii, xxiii, xii, i, xx, xiii, xxviii, xvii, vi, xxv, xiiii, iii.

Cum nunc in septimo decimo simus incipiente certe anno, epactas septimum decimum locum possidentes in ordine retrogrado, quæ etiam xxv sunt, ac naturales ordinaliter epactas, quot fuerint in Kalendis præsentis cuiuscumque mensis, ut puta nunc vi, mente diligenter conspiciente pariter congrega. Quæ porro xxxi fiunt; de his xxx expulsis, unus remanet. Sic primus mensis huius rationis, hoc est Aprilis esse videtur.

3. Sic in omnibus diebus mensis Aprilis hanc rationem indubitanter considerabis, verbi gratia, prædictas retrogradas epactas cum lunæ ætate cuiuscumque diei Aprilis simul iunge, ut puta in tertio decimo die modo ipsius, octava decima luna fieri videtur. Si cum retrogradis epactis, quæ xxv sunt in hoc anno, xviii coniunxeris, xliii erunt; de his si expellas xxx, remanent xiii. Ab istis quot remanserunt postquam xxx abstuleris, quocumque fuerunt dies a principio mensis ante præsentem quemque diem, in quo computabis epactas, quas coniunges cum retrogradis, ut puta nunc xii, subtrahere, remanet unus. Ita primus mensis, hoc est Aprilis, argumentans fore probabitur.

4. Si post consumptam lunam in eadem mense, eandem rationem speculari volueris, retrogradas epactas quocumque fuerint, ut puta xxv, atque integram lunam in isto mense finitam, ac ætatem lunæ in quocumque die eiusdem mensis, verbi causa, in vigesimo septimo die, tertiam lunam, quæ pariter, lvii cumulabunt, in unum congrega; ablatis xxx, remanent xxvii. Ex his quot fuerunt præcedentes omnes dies a principio mensis, ut puta xxvi, ante diem in quo consideravimus epactas, proice, remanet unus. Ita primus mensis, id est Aprilis, præsens esse cognoscitur.

DE MAIO.

5. Si prædictas epactas retrogradi ordinis, id est xxv, et epactas naturales, quæ in Kalendis mensis sequentis erunt, id est vii, simul iungas, xxxii constabunt; subtractis xxx, non amplius quam ii remanent. Ita secundus mensis esse monstrabitur.

6. Sic in cunctis diebus mensis Maii idem ius prævideto, hoc est epactas cuiuscumque diei illius, verbi gratia, quinti decimi diei,

quae in isto anno xxi sunt, epactasque xxv retrogradi ordinis simul compone; quae xlvi fiunt. Ab his aufer xxx; remanent xvi. Ex istis iterum universos ab initio mensis dies, antecedentes diem, in quo epactas numeravimus, subtraha; remanent duae. Ita secundus mensis ab Apreli praesens fore intellegitur.

7. Si post finitam lunam epactas cuiuscumque diei in eodem mense, ut puta vigesimi septimi, quae tres sunt et lunam prius integram, ac retrogradas epactas, quae pariter lviii erunt, coniungas; expulsis xxx, remanent xxviii. Ex his si proicias eiusdem mensis dies quocumque fuerint, ut puta xxvi, praecedentes diem, in quo epactas numeravimus, remanent duae. Sic secundus mensis indubitanter fieri cernitur.

DE IUNIO.

8. Si cumulaueris iterum praenunciatas epactas xxv cum epactis Kalendarum tertii mensis, quae sunt viii, xxxiii fore manifestantur. Sic xxx proiectis, iii remanentes, tertius mensis id est Iunius esse videbitur.

9. Sic in universis diebus eiusdem Iunii eadem ratio consistit. Si epactas cuiuscumque diei in eo, verbi causa, tertii decimi, quae in hoc anno xx sunt atque retrogradas epactas, quae videlicet una xlv fiunt, copulaveris; ab his xxx sublecti, remanent xv. Si rursus ab isdem dies quocumque fuerint, ut puta xii antecedentes diem epactarum, quas computando praevidimus, abstuleris, remanent iii. Ita tertius mensis esse manifesta videtur.

10. Si post terminatam lunam eadem iura scire volueris, epactas lunares cuiuscumque diei eius mensis, verbi gratia vigesimi quinti, quae iii sunt ac totam praecedentem lunam retrogradasque epactas congrega, quae copulatae omnino lvii cumulant; subtractis xxx, remanent xxvii. Ex his iterum si auferas xxiiii dies antecedentes diem epactarum, remanent iii. Sic tertius mensis ab Apreli fieri non ignoratur.

11. Eodem modo in aliis cunctis sequentibus mensibus usque ad finem Martii facito. Retrogradi ordinis per singulos annos epactis, quae primum Apreli deputantur, omnibus mensibus aequaliter iunctis. Sed quando congregatio epactarum retrogradi ordinis et epactarum pariter, quae fiunt in Kalendis cuiuscumque mensis, minor quam xxx contigerit, ab illo die usque ad finem Martii non abstrahito xxx. Nam postquam numerum dierum a principio mensis praecedentium praesentem diem, de numero praedictarum epactarum abstuleris, ostendet tibi remanens numerus quotus mensis est ab Apreli. Alia quae in his contraria esse contemplantur, in sequentibus dicam.

CAP. II.

1. Si postquam xxx subtraxeris vel cum nihil abstuleris, vii in Kalendis remanserunt, primo tempore unum expellito, secundo nihil proicito. Ita cum viiii esse videris primo unum auferto, secundo nullum. Pene sic dum xi fore conspexeris, primo unum separato, secundo non solum nullum proicito sed etiam unum addere debes, et dum xxx subtraxeris, cum nihil ante abstuleris, quando xii remanere contempleris, unum semper auferto.

2. Sic in omnibus diebus illorum mensium facito. Sed si mensem Augustum, trigesimo illius die terminans, finieris, et remanentem illius diem sequenti Septembri coniunxeris, ut ita xxx dies atque unum habeat, eodemque modo novissimum Octobris diem Novembri addideris, at postremum Decembris Ianuario auxeris, ast non solum ultimum Ianuarii, sed primum Martii diem Febuario supplens cumlaveris, ut Martius non amplius habeat in ista ratione quam xxx dies, sicut Augustus, October, ac December, omnes hic istae praedictae contrariae regulae evanescentes nunquam erunt.

CAP. III.

De contrariis regulis.

1. Si rursus alias contrarietates, quae in aliquibus locis, nisi caveantur, hanc possunt turbare regulam, praevidere volueris, ut non variare istam valeant, horum quidem curiose memor esto.

Ut in prima parte semper octavi anni, hoc est in Maio inveniando, unum regularem augeas, et in Iulio, si non trigesimam sed vigesimam nonam in Kalendis illius verius lunam observare volueris. Ac in Maio etiam, semper in nono decimo anno similiter facias. Atque si in Kalendis Februarii in decimo tantum primam lunam invenias, lunam eiusdem Februarii in fine Ianuarii consumptam pariter cum prima praedicta luna iungas. Sed, si trigesimam embolismi lunam verius quam primam in Kalendis Februarii, servare volueris in Martio, non unum, sed duos regulares augeto.

2. Si autem in novissimo anno lunarem saltum, more Anglorum, in vigesimo quarto die mensis Novembris observaveris, ubi consequenter x videas, unarium expellito, ubi xii primo vel xiii, binarium proicito, ubi xii novissime, regulariter. Ideirco hanc rationem ab Apreli incipio, quia mensis (2) pascalis, qui secundum diurnum praecceptum principium lunarium mensi tenet, aut in Apreli finitur, aut

incipit, aut omnis in illo conducitur, et quin hic vere primus est mensis post lunarem saltum.

In Christo domino felix sine fine valet.

Glória morte carens iam sit tibi summa perennis.

CAP. IIII.

1. Quippe quotum lumen, si vis cognoscere, mensis, Quotque dies sunt illius reliqui, ista videto.

DE APRELI.

Si quotus dies est mensis argumentari concupiscas, a Kalendis Aprilis, ut prius dictum est, incipe, et praedictas epactas vigesimi quinti diei mensis Martii retro conversim praescriptas, quae sequuntur observa :

xxi, x, xxviii, xviii, xii (3), xxvi, xv, iiii, xxiii, xii, i, xx, viiii, xxviii, xvii, vi, xxv, xiiii, iii.

Cum in mense modo Apreli iniamus, in septimo decimo, ut praedictum est, anno, epactas septimum decimum locum in ordine retrogrado habentes, quae etiam xxv sunt, ac naturales epactas praesentis cuiuscumque diei, quot fuerint, ut puta nunc xxiii, simul iunge, quae porro xlviiii fiunt; de his xxx semper expulsis, xviii remanent. Sic octavus decimus dies mensis Aprelis hodie esse videtur.

2. Si rursus quot forte dies praesentis mensis usque ad Kalendas alterius sequentis restant, cognoscere volueris, lunae aetates, quae post xxx supra fuerant, verbi gratia nunc xviii, de isdem xxx prius expulsis, iterum subtrahe, remanentibus xii. Sic palam xii tantum dies usque ad Kalendas succedentis mensis restant. Ita in Februario sed cum duobus regularibus additis semper fac. 3. Si iterum primam rationem plene contemplari desideraveris per nuntiatas epactas retrogradas, id est xxv, atque integram lunam in hoc mense omnino finitam, succedentesque iterum in eodem mense epactas quot volueris, ut puta iii, cumula, quae simul lvii penitus fiunt. Post haec xxx subtrahe; sic xxvii remanent. Nec non vigesimus septimus dies ita esse huius mensis deprehenditur. 4. Si quoque, quot dies eius mensis usque ad Kalendas subsequentes restant, requiras, numeros, qui post xxx expulsos remanserunt, ut sunt modo xxvii, sicut prius lucide ostensum est, de eodem calculo primitus subtracto eice. Cum iii nunc supra fuerint, nec minus iii supra esse dies ante Kalendas sequentes certum est. Quod si nihil supra fuerit de xxx, ita nihil remanere de hoc tali mense videbis, sed Kalendas mensis sequentis crastino die provenire cognosces.

DE MAIO.

5. Si quotus quidem dies est mensis Maii non dubitare cupias, epactas vigesimi quarti diei mensis Martii ficto ordine retrorsum ita conversas, xx, viiii, xxviii, xvii, vi, xxv, xiiii, iii, xxii, xi, xxx, xviii, viii, xxvii, xvi, v, xxiiii, xiii, ii, atque epactas praesentis diei, quot fuerint, ut puta xxiii, pariter compone, quae penitus xlvi fiunt; xxx repulsis, xvii solum modo remanent. Sic septimus decimus mensis Maii dies adesse videtur. Si rursus easdem epactas xvii, quae post xxx remanserunt, sed uno prius ab illis subtracto, ut xvi tantum sint, de xxx dempseris, nec minus nec maius quam xiiii superabunt. Sic xiiii dies usque ad Kalendas succedentes consistunt. Si post unum expulsus nihil habeas quod de xxx repellas, xxx dies usque ad finem mensis remanere videbis. Sic in Iulio, Augusto, Octobri, Decembri, Ianuario, Martioque eadem regula procul dubio permanet, eo quod unum amplius diem quam iiii alii menses habent.

6. Si rursus primam regulam diligenter discutias, fictas retro epactas integramque lunam in tempore huius mensis consumptam, et praesentes epactas, quot fuerint, verbi gratia iii, iunge. Quae simul lvii fiunt; sic xxx relictis, xxvii supra sunt. Nihilo minus vigesimus septimus mensis Maii dies adfore conspicitur.

Si eandem computationem epactarum post xxx expulsos remanentium, sed sicut nuper praedictum est, una minus aetate, ut nunc xxvi sunt, de hisdem xxx iterum disiungas, iiii tantum modo superant. Ita iiii dies usque ad Kalendas subsequentes supra esse cernuntur. Sic in aliis mensibus qui plus quam xxx dies habent, ceu praenunciatum est, haec regula manebit.

7. Sic rursus vigesimi tertii diei mensis Martii conversas retro epactas, quae sequuntur Iunio deputa :

xviii, viii, xxvii, xvi, v, xxiiii, xiii, ii, xxi, x, xxviii, xviii, vii, xxvi, xv, iiii, xxiii, xii, i. Sic vigesimi secundi diei Martii conversim Iulio : xxiiii, vii, xxvi, xv, iiii, xxiii, xii, i, xx, viiii, xxviii, xvii, vi, xxv, xiiii, iii, xxii, xi, xxx. Sic vigesimi primi diei Martii Augusto : xvii, vi, xxv, xiiii, iii, xxii, xi, xxx, xviii, viii, xxvii, xvi, v, xxiiii, ii, xxi, x, xxviii. Ita sunt novissimae epactae huius praedicti retrogradi ordinis, quae primae naturaliter constant, quasi prius lunaris saltus fuisset. Sicut in aliis epactis retrorsum versis sequentibus erit. Sic noni decimi diei Martii, Septembri, Octobrique : xv, iiii, xxiii, xii, i, xx, viiii, xxviii, xvii, vi, xxv, xiiii, iii, xxii, xi, xxx, xviii, xvii, vi, xxv. Sic septimi decimi Martii, Novembri, ac Decembri : xiii, ii, xxi, x, xxviii, xviii, vii, xxvi, xv, iiii, xxiii, xii,

i, xx, viiii, xxviii, xvii, vi, xxv. Sic quinti decimi diei Martii praecedentis in Ianuario atque Martio sequenti: xi, xxx, xviii, viii, xxvii, xvi, v, xxiiii, xiii, ii, xxi, x, xxviii, xviii, vii, xxvi, xv, iiii, xxiii. Sic quarti decimi diei mensis Martii positas conversim epactas soli Februario coniunge: x, xxviii, xviii, vii, xxvi, xv, iiii, xxiii, xii, i, xx, viiii, xxviii, xvii, vi, xxv, xiiii, iii, xx.

CAP. V.

1. Sed in octavo videlicet istius rationis anno, in mense semper Maio, et in Iulio si non trigesimam nonam lunam in Kalendis illius esse dicas, ac in nono decimo in Maio, atque in decimo anno in Martio, si non primam sed trigesimam embolismi lunam in Kalendis Februarii fore adfirmare cupieris, unum regularem addito. Nam si primam utique lunam in Februarii Kalendis magis esse volueris, praedicti eiusdem Februarii lunam in novissimo die mensis Ianuarii finitam, cum epactis unius cuiusque diei in omni Februario simul cumulato. Verum etiam in Martio nihil communem regulam turbabit. Etsi lunarem saltum in vigesimo quarto die mensis Novembris, secundum Anglos, complere volueris ab illo etiam die usque ad ultimum mensis Martii diem, epactis naturalibus unius cuiusque praesentis diei, atque epactis positi retrorsum ordinis, pariter iunctis, unum subtrahito ante quam xxx repellas.

2. Sed si secundum Graecorum ac Latinorum regulam, quam meae gens in Hibernia in hac ratione semper custodit, praedictum saltum in vigesimo secundo die mensis Martii sequentis, iuxta primum tempus creationis lunae rationabiliter observaveris. Unum, quem praediximus expelli nisi in decem tantum modo novissimis diebus mensis Martii, tamen non proicito.

3. Praeterita aut praesens sic non fallat me futura ;
 In cunctis quota sit semper lux mensibus anni.
 Te summus dominus semper custodiat almus,
 Ut fugias geminum peccantum rite periculum.

CAP. VI.

1. En iterum poteris bina argumenta videre,
 Si placet auriculis nova iura haec sumere vestris ;
 Id crescens numerus per sese ac multiplicatus,
 Ut per se semper monstrentur utrique vicissim.
2. Si vis numerum, quem geometrico trigonum iure philosophi nominant, quem saepe dicimus crescentem numerum, apte per

argumentum magis facile cognoscere, e contra quam per simplicem communis rationem sermonis quemcumque volueris numerum per sequentem continuatim, et eundem sequentem eodem modo per praecedentem debes multiplicare. Praedictis binis numeris alternatim per se multiplicatis, relicta altera, dimidiam solam partem teneto, quam semper triangulum numeri prioris habebis. Nam in crescentis numeri ratione semper quantum dicis, tantum addere servabis supra omnes praecedentes ab unario congregatos pariter numeros. Si enim v sexies multiplicaveris, xxx habebis, expulsa dimidia eiusdem numeri parte, xv remanere videntur. Quos iure crescentis numeri quinariis possidet. Quando dico unarium, unum solum habeo. Quando binarium, iunctu cum unario simul, iii. Quando ternarium cum binis antecedentibus summulis, vi. Quando quaternarium, x. Quando quinarium, xv plene esse videbo. Sic semper in aliis cunctis haec regula immobiliter stabit.

3. Si rursus per trigonum vicissim scire multiplicatum per semet ipsum numerum desideres, trigono per binarium semper crescente, de illa dupliciter multiplicatione numerum, quo novissime suppletus fuerit ille triangulus, subtraha, post haec per se ipsum multiplicatus totus tantum remanebit numerus. Nam si ex triangulo senarii, qui per binarium ductus xlii efficit, senarium expellas, factos per senarium numeros solum modo hoc est xxxvi remanere non dubitabis. Qui comptus per senarium multiplicatum per se ipsum procreatur. Cum sine hac regula trigonus in multitudine nimis crescens difficulter agnoscitur. Per hanc igitur rationem ingeniosus quisque eum sine labore reperiet. Ita inter utrumque numerum per haec duo argumenta alter alterum monstrabit.

4. Si cupias, breviter hoc ius per metra profabor,
 Quod prius historicae narravi famine prosae.
 Namque iuvat merito mutatio saepe ciborum,
 Praesertim regum mensis dum multa parantur.
 Propter ea regi pauper convivia feci.
 Ut vidua Heliae dans caenam aliena parabat.
 Postremum ecce prior si multiplicaverit in se
 Dimidia numerus crescens in parte locatur.
 Quinque quater facti viginti rite creabunt,
 Dimidiam partem, denos qui semper habebunt,
 Crescenti in numero retinent quos quattuor illi,
 Cernitur en numerus crescens per multiplicatum.
 Si post, consumpto primo, vis scire secundum
 Hic argumentum, quae contemplare sequuntur.

Crescentem numerum si iam duplicaveris, ille,
 Qui per se crescit pulsa genitrice manebit.
 Crescentem numerum retinet quinarius omnem.
 Quinque ter educti bis qui triginta locabunt,
 Ex quis si fuerint disiuncte quinque relictī,
 In iurum norma viginti quinque manebunt.
 Quem numerum penitus per semet quinque creabunt.
 Sic inter numeros praedictos fame binos,
 Alter et alterius quod monstrat iura videtur.
 Proditor alterius, velut alter uterque vicissim
 Esset, cum nec hic illius vult damna videre.

5. Successor Caroli, felix Hloduice, valetō,
 Dicuil haec ego quae feci argumenta videto,
 Post octingentos post septennosque bis annos.
 Conceptu domini haec in mense sequente peregri.
 Namque cito adventum speravi cernere vestrum,
 Dum mensis Maius septem bis lumina sumit,
 Cum vobis tribuant dites iam munera digna.
 Tradere tum volui quamvis mea iulea dona.
 Nam vidua attribuens templo sua bina minuta,
 Iam maiora dedit quam plurima dona potentum.
 Sic ego quod potui vobis donare cupivi.
 Ecce fere stabulis armenta crescesque feruntur.
 Corpora tarda boum dissolvens fessus arator.

CAP. VII.

1. Tempora per lunae cursum tyrania cerne,
Ut quotus est mensis vel lux mensis quota noscas.

Epactae in Kalendis omnium mensium secundum tempus praecedentium argumentorum :

Apl. } Salt. }	Mai.	Iun.	Iul.	Aug.	Sep.	Oct.	Nov.	Dec.	Ian.	Feb.	Mar.
x	xi	xii	xiii	xiiii	xv	xvi	xviii	xviii	xx	xxi	xx
xxi	xxii	xxiii	xxiiii	xxv	xxvii	xxvii	xxviii	xxviii	i	ii	i
ii	iii	iiii	v	vi	viii	viii	xi	x	xii	xiii	xii
xiii	xiiii	xv	xvi	xvii	xviii	xviii Emb.	xxi	xxi	xxiii	xxiiii	xxiii
xxiiii	xxv	xxvi	xxvii	xxviii	xxx	xxx	ii	ii	iiii	v	iiii
v	vi	vii	viii	viii	xi	xi	xiii	xiii	xv	xvi	xv
xvi	xvii	xviii	xviii	xx	xxii	xxii	xxiiii	xxiiii	xxvii	xxvii	xxvi
xxvii	xxvii	xxviii	xxx	i	iii	iii	v	v	vii	viii	vii
viii	viii	x	xi	xii	xiiii	xiiii	xvi	xvi	xviii	xviii	xviii
xviii	xx	xxi	xxii	xxiii	xxv	xxv	xxvii	xxvii	xxviii	i	xxviii
xxx	i	ii	iii	iiii	vi	vi	viii	viii	x	xi	x
xi	xii	xiii	xiiii	xv	xvii	xvii	xviii	xviii Emb.	xxi	xxii	xxi
xxii	xxiii	xxiiii	xxv	xxvi	xxviii	xxviii	xxx	xxx	ii	iii	ii
iii	iiii	v	vi	vii	viii	viii	xi	xi	xiii	xiii	xiii
xiiii	xv	xvi	xvii	xviii	xx	xx	xxii	xxii	xxiiii	xxv	xxiiii
xxv	xxvi	xxvii	xxviii	xxviii	i	i	iii	iii	v	vi	v
vi	vii	viii	viii	x	xii	xii	xiiii	xiiii	xvi	xvii	xvi
xvii	xviii	xviii Emb.	xx	xxi	xxiii	xxiii	xxv	xxv	xxvii	xxviii	xxvii
xxviii	xxviii	xxx	i	ii	iiii	iiii	vi	vi	viii	viii	viii

2. Praescriptae secundum quosdam in aliquibus aliter rursum scriptae :

Apl.	Mai.	Iun.	Iul.	Aug.	Sep.	Oct.	Nov.	Dec.	Ian.	Feb.	Mar.
x	xi	xii	xiii	xiiii	xvi	xvi	xviii	xviii	xx	xxi	xx
xxi	xxii	xxiii	xxiiii	xxv	xxvii	xxvii	xxviii	xxviii	i	ii	i
ii	iii	iiii	v	vi	viii	x	x	x	xii	xiii	xii
xiii	xiiii	xv	xvi	xvii	xviii	xviii	xxi	xxi	xxiii	xxiiii	xxiii
xxiiii	xxv	xxvi	xxvii	xxviii	xxx	xxx	ii	ii	iiii	v	iiii
v	vi	vii	viii	viiii	xi	xi	xiii	xiii	xv	xvi	xv
xvi	xvii	xviii	xviiii	xx	xxii	xxii	xxiiii	xxiiii	xxvi	xxvii	xxvi
Emb. xxvii	xxvii	xxviii	xxviiii	i	iii	iii	v	v	vii	viii	vii
viii	viiii	x	xi	xii	xiiii	xiiii	xvi	xvi	xviii	xviiii	xviii
xviiii	xx	xxi	xxii	xxiii	xxii	xxv	xxvii	xxvii	xxviii	xxx	xxviii
xxx	i	ii	iii	iiii	vi	vi	viii	viii	x	xi	x
xi	xii	xiii	xiiii	xv	xvii	xvii	xviii	xviii	xxi	xxii	xxi
xxii	xxiii	xxiiii	xxv	xxvi	xxviii	xxviii	xxx	xxx	ii	iii	ii
iii	iiii	v	vi	vii	viii	viii	xi	xi	xiii	xiiii	xiii
xiiii	xv	xvi	xvii	xviii	xx	xx	xxii	xxii	xxiiii	xxv	xxiiii
xxv	xxvi	xxvii	xxviii	xxviiii	i	i	iii	iii	v	vi	v
vi	vii	viii	viiii	x	xii	xii	xiiii	xiiii	xvi	xvii	xvi
xvii	xviii	xviiii	xx	xxi	xxiii	xxiii	xxv	xxv	xxvii	xxviii	xxvii
Emb. xxviii	xxviii	xxx	i	ii	iiii	iiii	vi	Salt. vii	viii	x	vii

Quisquis vult facile haec scripta argumenta videre,
Hos binos ciclos studeat sic scribere certe.

CAP. VIII.

1. In his versiculis ludens enigmata canto.
Plurima decrescunt per quae crescuntque minora.
Quatuor en tantum versus retinere videbis.
Porro pedes quadringentos triginta duosque,
Unusquisque tenens centum semel ac semel octo,
Mille octoque simul iam quorum syllabae habentur.

Tu quartum partem quartam discernere nosces,
 Quae nec longior una manet quam pagina parva,
 Ad dextram partem gradiens a parte sinistra.
 Nec non viginti quingentas milia bina.
 Litterulas idem versus bini bis habebunt.
 Unus versiculus quot congregat haud dubitabis.
 Quod minus est auxi, quod maius de me recuro.

2. Versiculos novies plene meditabimur octo,
 Qui tenuere pedes viginti quattuor in se.
 Tamquam pes unus posset tres condere versus,
 In quis syllabae erunt sex quinquagintaque tantum
 In numero versus, quae non aequare valebunt.
 Per sex atque decem nam stant his quippe (4) minores,
 In quis litterulae centum triginta decemque.
 Litterulae sedem unius dyptongus habendo,
 Quae duplicem numerum nec habebunt versiculorum.
 Sex triginta quater duplum horum namque videmus.
 Has binas vere rationes esse probabis.
 Quae loquor haec quoniam confestim iura sequuntur.
3. Quattuor incipiunt multos qui rite creabunt,
 Tempora ferventis velocis cernite solis
 Roscida servantes tardantis lumina lunae
 Menstrua metimur longos per sidera ciclos
 Lucida mutatis miscentes famina verbis.
 Quattuor aspectis praescriptis versibus istis,
 Sex duodenos versiculos iam cerne futuros.
 Quicquid habent multi paucorum iure videtur,
 Nec plus multi aliud quam quod pauci anteprehendunt.
4. Quattuor incipiunt L sex triginta bis odae.
 Tempora ferventis velocis cernite solis
 Roscida servantes tardantis lumina lunae
 Menstrua metimur longos per sidera ciclos
 Lucida mutatis miscentes famina verbis
 Cernite velocis ferventis tempora solis
 Lumina tardantis servantes roscida lunae
 Sidera per longos metimur menstrua ciclos
 Famina miscentes mutatis lucida verbis
 Tempora miscentes per longos cernite solis
 Roscida ferventis servantes lumina lunae
 Menstrua mutatis tardantis sidera ciclos
 Lucida velocis metimur famina verbis

Cernite per longos miscentes tempora solis
 Lumina servantes ferventis roscida lunae
 Sidera tardantis mutatis menstrua ciclos
 Famina metimur velocis lumina verbis
 Lucida servantes miscentes famina solis.
 Menstrua per longos ferventis sidera lunae
 Roscida mutatis velocis lumina ciclos
 Tempora metimur tardantis cernite verbis
 Famina miscentes servantes lucida solis
 Sidera ferventis per longos menstrua lunae
 Lumina velocis mutatis roscida ciclos
 Cernite tardantis metimur tempora verbis
 Cernite tardantis velocis tempora solis
 Lumina metimur servantes roscida lunae
 Sidera per longos ferventis menstrua ciclos
 Famina mutatis miscentes lucida verbis
 Tempora velocis tardantis cernite solis
 Roscida servantes metimur lumina lunae
 Menstrua ferventis per longos sidera ciclos
 Lucida miscentes mutatis famina verbis
 Famina mutatis metimur lucida solis
 Sidera tardantis velocis tempora lunae
 Lumina servantes miscentes menstrua ciclos
 Cernite ferventis per longos roscida verbis
 Lucida metimur mutatis famina solis
 Tempora velocis tardantis sidera lunae
 Menstrua miscentes servantes lumina ciclos
 Roscida per longos ferventis cernite verbis
 Roscida per longos miscentes lumina solis
 Lucida servantes ferventis famina lunae
 Tempora tardantis mutatis cernite ciclos
 Menstrua metimur servantes sidera verbis
 Sidera servantes metimur menstrua solis
 Cernite mutatis tardantis tempora lunae
 Famina ferventis servantes lucida ciclos
 Lumina miscentes per longos tempora verbis
 Menstrua velocis tardantis sidera solis
 Tempora servantes metimur cernite lunae
 Lucida ferventis per longos famina ciclos
 Roscida miscentes mutatis lumina verbis
 Lumina mutatis miscentes roscida solis

Famina per longos ferventis lucida lunae
 Cernite metimur servantes tempora ciclos
 Sidera tardantis velocis menstrua verbis
 Lumina ferventis servantes roscida solis
 Famina miscentes per longos lucida lunae
 Cernite velocis mutatis tempora ciclos
 Sidera metimur tardantis menstrua verbis
 Menstrua tardantis metimur sidera solis
 Tempora mutatis velocis cernite lunae
 Famina miscentes servantes lucida ciclos
 Roscida servantes ferventis lumina verbis
 Sidera metimur mutatis menstrua solis
 Cernite velocis tardantis tempora lunae
 Famina miscentes servantes lucida ciclos
 Lumina per longos ferventis roscida verbis
 Roscida ferventis per longos lumina solis
 Lucida servantes miscentes famina lunae
 Tempora tardantis velocis cernite ciclos
 Menstrua mutatis metimur sidera verbis.

5. Longaevus victor Caesar Hloduice valet,
 Dicuil haec ego quae feci ioca visa teneto.
 Bis novies moti versus hac arte quaterni,
 Linguarum numero ludo sic ecce fruuntur.
 Unusquisque movet versus hic ordine partes,
 Bis binas statuens aliis in sedibus ipsas
 Praeter particulam, quae sede priore meretur,
 Nomen habendo locum primas haec ante sorores.
 Namque manet habitans prior ipsa prioribus (5) ipsa,
 In his carminibus tantum quae quinta movetur,
 In quoquo manet versu per iura movendi.
 Quamquam ora- tantum partes velut esse -tionis.
 Bis binae semper mutatae quippe valebunt
 In his versiculis praedictis iure movendi,
 Rite sub accentu cum pars velut una videtur.
 Haec pars et casus iam cui coniungitur apte,
 Donato atque aliis vere testantibus illud.
6. Iura loquens forsitan haec verba superflua dico,
 Semper versificis in his dum narro loquelis,
 Dum per eum canimus non curat carmina nostra.
 Quamquam solam ipsam coniunxi in carmine regi,
 Ex illo fieret quasi dux in honore secundo.

Quamvis sit praesens ego cum sibi carmina canto.
 Non aurem mihi, non verbum, non munera reddit,
 Non oculis cernit, mente haud me cogitat umquam.
 Sed tamquam muto et surdo sensu absque canebam.
 Sic stolide cecini insensato carmina vana,
 Vel sicut duro domino tumidoque potenti.
 Ob hoc linquentes haec cetera iura canamus,
 Huic ludo quae convenient ratione iocandi.
 Iam, si spondet is, finem variaverit odæ
 Postremus constans versus, qui terminat istos ;
 Hoc est ter rursus praeter hoc quod stat in arte.
 Augebunt numerum bis centum atque bis octo,
 Si simul hi numeri iuncti essent prorsum in unum,
 Bis centum octo undecies utrique manerent.
 Idem spondeus loca nam si prima teneret,
 Bina bis in versu, et si dactilus ultimus esset,
 Ut non versiculos ex iuris lege moveret,
 Ceu valet in quinta versus regione manere.
 Possent praedictis nec non certe addere summus,
 Centum et mille semel denos quater atque bis hic sex,
 Ut cuncti pariter versus numeri ordine certo
 Mille semel centum quater ac deni quater essent.
 Non solum binos versus bis novimus istos.
 Tu sese ut quisquis tot dicta movere videtur,
 Si coniungatur parti per porro sequenti,
 Sed totidem partes mutant cuncti ecce loquelæ.
 Id nomen verbum trahit et quae nomen ab illis,
 Et quae nomen habet qui preponitur ipsis
 Litterulæ primis binis in versibus ipsis
 Sunt septem decies, totidem tenuere sequentes
 Octonos, senos, trinos, binosque quaternos,
 Sex cum trigenis, viginti cumque quaternis,
 Cum denis octo, duodenos quippe novemque
 Per numeros cernes hic multiplicando vicissim,
 Denariis binis bis crescentes solidi sex.
 Usuram parvi hanc lucri volo reddere magnam,
 Ut non inveniari servus malus ac piger esse,
 Concupiens terram fodere abscondendo talentum.
 Liber enim neque sum, cogar ne reddere censum,
 Praesertim Franco portent dum munera regi.
 Idcirco augusto censum portare parabo,

More volens illi famuli servire fidelis.
 Conspice ludificum munus hoc vile peractum.
 Hoc tibi si placeat paria addam munera rursum.
 Splendidus occasu sol ignea lumina celans,
 Sidera conducunt nigras nocturna tenebras.

7. Si moveretur spondeus in quinto loco in praedictis versibus, sic mutaretur :

Solis verbis ciclos lunae
 Lunae ciclos verbis solis
 Ciclos lunae solis verbis
 Verbis solis lunae ciclos.

Ita in primo et secundo ac tertio atque quarto loco eorundem versuum.

Post (6) quatuor versus multiplicandos septuagies et bis, praedicti numeri in aliquibus post ciclos prioribus versibus, cviii, cclii, dextxxx, dextxxx, dextlviii, dextxii. In aliis posterioribus versibus, cexvi, cclxxxviii. In aliis continuo sequentibus, icelii, iccccxl.

CAP. VIII.

1. Quisquis videns voluerit hos versus reprehendere,
 Cernat prius legitime modos communis syllabae,
 Breves ac longas syllabas, pedes, tonos, communiter,
 M et aplasmos et scemata, tropos, punctos, memoriter.
 Ac duodena vitia, quae sunt in prosa turpia,
 In metro cum peritia absque ulla stultitia,
 Sed cum vere invenerit quod debet reprehendere,
 More fraterno corrigat, ut me possit defendere.
 Nam tumidae superbiae loquor verba audatia,
 Sed tantum corde simplici narro vera veracia.
 Quisquis es tu, fratercule, ora pro me saepissime,
 Ut usum vitae sobriae consumam felicissime.
 Gloria patri domino spiritui ac filio,
 Hic et semper perpetuo sit in futuro saeculo.

LIBELLUS SECUNDUS.

CAP. I.

1. Quantum inter terram legimus culmenque polorum
 Esse, hic argumenta videns lunaria, cernes.
 Postquam iam cecini tantum de sole superno,
 Pauca canam varie de lunae cursibus imae.
 Multi adfirmantes semper currentis, ut aiant,
 Aeris imi inter fines atque aetheris alti (7),
 Ut subtus habeat quingentos milia dena
 Leucarum numeros inter se et gramina terrae.
 Rursum solis adusque vias a tramite lunae
 Dupla ferunt fieri per calles aetheris alti.
 Sic a sole iterum secerni sidera fixa
 Tripliciter quantum a luna solem esse loquuntur.
 Pythagoras primo docuit haec mente sagaci.
 Ecce decem novies sic milia mille quaterque
 Milleque dimidium iam leucarum unius una
 Inter terrae orbem convexaque summa polorum.
2. Cum binae leucae non sint nisi milia trina,
 Quas leucas dixi quot sunt per milia cerne.
 Interea, ut lapidis consummunt milia signa,
 Sic illa in vacuis spaciis volo fingere celsis,
 Planior ut numerus sit quam milia dicam.
 Milia quot fuerint signa enumerabo tot esse;
 Quot quisquis videat discernens omnia signa,
 Ut facile agnoscens spectet tot milia multa,
 Milibus in leucis, spectis per milia signis,
 Praedicto in spacio cernes quod tramite longo,
 Centum et quadraginta unum exstant milia signa.
 Cum virgis supra ut noscas fore milia cuncta,
 Iam centum quater ac ter quinquaginta semelque
 Simpliciter debes iterum discernere signa.
 Sic finis numeri culmen tum tangit Olympi.
 Quisquis vult iterum in stadiis magis ista videre,
 Tum videat versus subtili mente sequentes,
 Qui monstrant plene vere quod, iure probato,
 Milium erunt mille et centum trigintaque signa

Quattuor atque iterum virgis cum prae memoratis,
 Ut noscat numeros quisquis per milia dici.
 Sic vacuum spacium lustrant sol lunaque summum
 Nona levans lunam subiens pars tertia solem.
 Sic multi spacium longum metantur inane.

3. Tu stadia enumerans tandem cognosce quod ipsa
 Mille unum fiunt etiam semper stadia octo,
 Per quae omnes veteres numerantur tantum haec sapientes.
 Ecce monent alii stadiis ita mille repulsis,
 Praedicto numero a terra ut sit semitae lunae
 Quinqueque viginti centum similia serves.
 Si leucas numeres bis quadraginta trahuntur
 Ac trinae leucae rursus et pars tertia leucae.
4. Iam quanto dicunt lunam discedere terra,
 Sic tanto Venerem spacio transcendere lunam.
 Inter quas medium fieri aiunt Mercurium aequae.
 Mercurius terra longe ceu fugit in alta.
 Sol quoque Venerem firmant transcendere pulchram.
 Et quantum terris iam luna putatur abesse,
 Sanguineus tantum Mars sole docetur haberi.
 Mars sicut vadit Phoebos sublimior ipso,
 Saturnus Marte egrediens ita scandit acerbo.
 Iupiter in medio discernens inter utrosque,
 Iupiter ut sole ascendens excelsior intrat.
 In caelo elongant Saturno sidera fixa.
 Sic longum vacuum mensurant ordine celsum
 Famine, qui cupiunt metiri ima atque superna.
 A terra lunam, luna iam Mercurium atque
 Mercurio Venerem, Venere alto tramite solem,
 Sole vident Martem, iam Marte Iovemque videbunt,
 Ac Iove Saturnum, Saturno sidera caeli,
 Quot stadia ac lucae quot sunt hic milia nosces.
 Quantum alii lunam terra distare docebant,
 Bis novies solem luna elongare putabant.
 Cuncta monent veteres paganorum haec sapientes.
 Idecirco audacter sensu contraria dicunt ;
 In his namque putare magis quam scire videntur.
 Pythagoras (8) Graecus magnus licet auctor habetur.
 Sic vobis volui quid in his ostendere certant.
 Quod tales causas scrutans te ludere scribam.
 Linquentes dicta haec nunc quod nunc instat agamus.

Postrema argumenta vide simul,
 Ut solis cursus et lunae cernere possis.
 Cum solem adfirmant alii lunamque habitare
 In firmamento summo inter sidera fixa.

CAP. II.

1. Alter in alterius iure ut monstratur uterque
 Mensis in his argumentis quotus esse videbis
 Lunaris iunctos per soles atque per annos.

Si quotus est lunaris mensis cognoscere volueris, annos quot fuerint post lunarem saltum a mense semper Apreli incipiens, ut puta nunc xviii, undecies multiplice qui cxcviii omnino fiunt; ex his si iii subtrahas tantum cxcv remanent; post expulsos trigenos numeros solum modo xv supersunt. His remanentibus dies praedicti mensis, non minus quam usque ad quintum diem, sive usque ad quemcumque diem post illum (9) eiusdem mensis volueris coniunge. Si quinque tantum dies, remanentibus xv, praedictis xv coniunxeris, xx erunt.

2. Post haec aetatem lunae non ante quintum praedictum etiam diem, sed illius quinti diei aut cuiuscumque diei eiusdem mensis Aprelis quot fuerit considera, ut puta nunc xxi. In quot unitatibus istae lunares aetates maiores sunt quam congregatus numerus annorum remanentium, post trigenos numeros subtractos ac dierum mensis usque ad diem in quo aetatem lunae cernere vis, id est modo quinti diei Aprelis, conspice. Cum coniuncto annorum remanentium dierum-praedictorum numero, qui nunc xx esse videtur, numerus aetatum lunae praenuntiati diei, qui modo xxi esse, unario tantum maior constet. Primus mensis fieri lunaris, hoc est paschalis sic equidem ostenditur.

3. Cur dixi non minus quam usque ad quintum diem, quem cum omnes dies praecedentes illum vel in Martio in quibus pascha fore contingit, seu in Apreli, sive cuncti sequentes usque ad postremum diem in quo eadem solemnitas regalis erit, esse evenit, carere paschali luna, quae semper est vere luna Aprelis, possint. Praedictus quintus dies numquam luna paschali caret. Sicut sextus et septimus mensis Martii dies nequaquam luna initii quadragesimae praecedentis temporis carere valent. Quae utraque quidem iura post conscripta argumenta in versifico ludo, si dominus permiserit, rursus diligentius ostendere cogito. Sed quando luna quae fit in Aprelis Kalendis non finit suum lunarem mensem ante quintum eiusdem diem Aprelis, sicut in omnibus,

praeter tantum modo iii, facere solet, non solum in diebus mensis, verum etiam in lunaribus aetatibus quaerendis a Kalendis eiusdem mensis has rationes inchoare poteris. Sic semper in priori parte huius mensis facito. Priorem partem dico quantos dies eiusdem mensis habet luna quae fit in quinto die ipsius. Quomodo posteriorem dico omnes dies illam sequentes lunam usque ad finem ipsius mensis.

4. Si in posteriori mensis parte eandem rationem investigare volueris, annis quot fuerint a principio praedicti cicli, ut puta nunc x et viii, undecies multiplicatis ut prius probavimus, non iii tantum, sed iiii expellito, postquam trigenos numeros proicias xiiii remanent. Quot dies ab exordio mensis usque ad quemlibet diem in posteriori parte illius volueris, verbi gratia usque ad vigesimum diem cognosce, quos si coniungas cum xiiii, videlicet xxxiiii fiunt. Epactas illius novissimi diei quo libet contingerint, ut sunt in hoc anno vii, consumptae lunae in priori parte mensis coniunge. Quae omnino xxxvi constare videntur. Cum lunarem numerum qui nunc est xxxvi ad numerum annorum atque dierum simul cumulatorum qui modo xxxiiii consistit inter sese comparaveris, videns lunarem numerum duabus unitatibus vincere alterum secundum, lunaris mensis, id est luna quae sequitur paschalem lunam fieri cognoscitur.

5. Si quoque in priori parte mensis Maii quotus lunaris mensis sit intellegere ita volueris, ex multiplicatis undecies praememoratis annis, cum iii expellas, ac deinde trigenis iterum numeris quot fuerint proiectis, xv remanere in isto anno cognosces et quot dies ab initio eiusdem fuerint, ut puta Kalendae, praescriptis xv remanentibus coniunge, qui simul xvi fiunt a Kalendis eius incipiens in qualibet die aetates lunae, verbi causa in Kalendis illius x et viii contemplare. Item si numero annorum atque dierum qui modo xvi est, aetatum lunae in praedictis Kalendis numerum quem x et viii esse cognoscitur, comparaveris, luna vincens binario annorum numerum ac dierum, secundum mensem lunarem praesentem fore non dubitabis. 6. Sic in priore parte omnium subsequentium mensium usque ad novissimum mensis tertii diem indubitanter intelleges. Si rursus in posteriori parte istius mensis postquam ex multiplicatis undecies annis non iii, sed quattuor auferuntur, ac demum trigeni numeri subtrahuntur, remanentibus xiiii, in hoc anno quocumque in Kalendis huius mensis dies fuerint sociaveris, verbi gratia xx, qui pariter xxxiiii fiunt, quotus sit lunaris mensis veraciter monstrabunt. Namque epactas vigesimi praedicti diei quae sunt in hoc anno vii, si finitae in isto mense lunae coniunxeris, xxxvii erunt, quas si ad xxxiiii compares vincens lunaris numerus ternario alterum, tertius

lunaris mensis praesens fieri certe spectatur. Sic in posteriori parte cunctorum sequentium mensium usque ad postremum mensis Martii diem has regulas manere spectaberis.

CAP. III.

1. Quando autem undecies annorum multiplicatio minus quam xxx cumulaverit, nihil in priori parte mensium nisi iii, in posteriori nisi tantum iiii, expellito, quod in duobus primis solum modo annis huius cicli naturaliter perseverat. 2. Post haec scire debes sicut in argumentis in praeterito anno factis praedixi, mensem Augustum in trigesimo die finire ac sequentem illius diem Septembri, tantundem ultimum Octobris diem Novembri, postremum aequaliter Decembris Ianuario, Ianuariique non solum novissimum iterum etiam Martii primum diem Februario coniungere, ut ita alternatim ab Apreli usque ad Februarium menses xxx dierum atque xxxi has rationes recte fit moverint, post illum mensem terminatum in priori parte omnium succedentium mensium non iii, sed iiii, ex multiplicatis undecies annis subtrahito, et in posteriori eorum parte usque ad finem Martii non iiii, sed v, auferto. Coniungens in illis lunam embolismi non solum lunae prioris partis in unoquoque eorundem mensium, sed etiam lunae posterioris pariter ac prioris usque ad finem Martii. In tertio quoque huius cicli anno post iii ab undecies solite multiplicatis sublato non aufer remanentes xxx, sed coniunge cunctis diebus omnium mensium illius anni. Similiter lunam embolismi in die antecedente Ianuarii Kalendas praecedentis consumptam in eodem tertio anno omnino omnibus aetatibus lunae coniunge. Ita in quartodecimo anno ex undecies multiplicatis annis postquam iii subtraxeris et in trigenos numeros remanentes diviseris, ab illis xxxi accipiens totis diebus universorum mensium iunge, ac embolismi lunam in Kalendis praecedentis Decembris finitam omnibus lunae aetatibus praedictorum mensium sociare memento.

3. Sed haec non secundum regulam iunctae embolismi lunae, sed secundum communem regulam fiunt. Regulam embolismi dico, id est iiii in priori parte mensis subtrahere et v in posteriori. Communem regulam iii in priori atque iiii in posteriori auferre, quae est hic in decimo vero anno cum luna embolismi in Kalendis Februarii finitatur in succedenti Martio regulam embolismi servato dum embolismi luna in illo tunc non iungatur. E contrario videlicet in sequenti statim undecimo anno eandem embolismi lunam a Kalendis Maii usque ad finem Martii coniungere debes ac embolismi regulam praeterire.

Sic in octavo quidem anno a Kalendis Augusti et in nonodecimo a Kalendis Iulii facito. Quorum prior praedictam lunam in quarto Aprelis die, alter in tertio terminat.

Sed in his duobus annis in priori parte mensis Iunii non iii, sed ii, ab annis undecies multiplicatis, neque iiii in posteriori, sed tantum modo iii, subtrahere custodito.

CAP. IIII.

1. Ibi sensus finit rursus nunc incipit idem.

Item sensus erit, sed non per idem referetur.

Si eandem rationem aliter intellegere volueris, istum ciclum decem et novem annorum per ternarios singulariter annuos partire. Ternarium hic dico iii annos. Sed primus huius cicli ternarius, sicut prius constitutus est, sic iterum in ista ratione manebit, si primum finitum expellens ternarium suscipias secundum, hoc est quartum quintum et sextum istius cicli annum undecies multiplicatis ipsius annis in priori parte mensium nihil abstrahe, in posteriori unum expelle. Sed hoc in primis duobus etiam ternarii annis, sicut in aliis ternariis, constabit. Nam in tertio anno in priori parte mensium xxx, in posteriori xxxi subtrahere (10). . . .

In quinto anno post lunarem sequentem saltum hoc est in secundo secundi ternarii anno, unum ostendemus exemplum: relicto primo ternario ex multiplicatis undecies duobus annis xxii fieri efficiuntur, quodlibet cuiuscumque mensis dies augere coniungens ipsis volueris, verbi causa Kalendas Aprelis adde, ita xxiii fiunt. Cum epactae illius diei quae tunc xxiiii erunt praedictum numerum unario vicerint, primum lunarem mensem fore manifestabunt. 2. Si autem tertium ternarium, id est septimum octavum nonumque istius cicli annum investigare volueris, non solum in primo illius undecies multiplicato anno, sed in primo simul atque secundo ac primo et secundo tertioque pariter multiplicandis iii regulares augeto, sublatis xxx in tertio anno in priori mensis parte illos qui remanserint diebus cuiuscumque mensis adiunge. Si illos iterum ad lunae aetatem ipsius novissimi diei, cui praedictum numerum sociasti, comparaveris quotus lunaris mensis fuerit indubitanter monstrabunt. Sic et in quarto annorum ternario, iii alios regulares super illos quos tertius ternarius habuit in sex fiant adiecta, in quinto ternario alios iii ac totidem in sexto, aliosque tantumdem ut xv sint in anno eos postremo sequente augeto. Hoc est relictis huius cicli vi prioribus annis, quibus non sunt regulares iuncti necessarii, ut quot annorum ternarios habueris, tot

regularium ternarios isdem superponas. Sic per eosdem menses, quos in antecedente ratione praedixi, eius iuris argumenta intellegi valebunt. 3. Sed in quocumque mense luna embolismi terminata fuerit, a principio sequentis mensis usque ad finem Martii, ab annis undecies multiplicatis in priori parte mensium unarium, in posteriori binarium expellito, ac, sicut in tertio primi ternarii anno tribus repulsis post multiplicatos undecies annos xxx in priori parte mensium, in posteriori iiii proiectis xxviii mensium diebus, atque embolismi praecedentis anni lunam omnibus cotidie aetatibus lunae iungere debes. Ita in secundo quinti ternarii anno xxxi in priori parte mensium, in posteriori xxx tantum modo diebus mensium ac embolismi lunam aetatibus lunae coniungere ne praetereas, et in primo quarti ternarii anno in mense Martio, quanquam lunam embolismi servare, lunae in illo non coniungas. Regulam tanem embolismi servare, id est in priori parte unarium ceu praedixi, et in posteriori binarium auferre memor esto. E contrario in succedenti secundo videlicet anno eiusdem ternarii, quamvis regulam embolisme non serves, lunam tamen embolismi a Kalendis Maii usque ad finem sequentis Martii cunctis aetatibus coniungere memento. 4. Sic in secundo quidem tertii ternarii anno a Kalendis Augusti, et in eo qui est post sex ternarios a Kalendis Iulii facere non praeterito. Atque in ipsis duobus annis unum alium regularem praeter illos praedictos multiplicatis undecies annis in priori parte mensis Iunii augeto, cum in posteriori illius parte nihil nisi multiplicatos undecies annos cum solitis regularibus addere debeas. Ac in secundo equidem anno sexti ternarii multiplicatis undecies annis regularibusque cum illis pariter coniunctis in solito more xxx subtrahe, quod sicut numque in primo anno. Ita nec in secundo ternario necesse erit tibi facere.

Regnator, salve, felix haec iura videto;
De quibus ulla prius numquam argumenta fuere.

CAP. V.

1. Argumenta mea atque meos, rex accipe, soles,
In quibus inyenies aetates ordine lunae,
Rite dies cernens atque annos mente sagaci.

Si quota sit item lunae cotidie aetas facile argumentari desideraveris, aetates lunae quocumque fuerint in praecedenti die ante quorum mensium Kalendas, quotlibet diebus cuiuscumque mensis cuius Kalendis praedictis coniunge. Ita si minus quam xxx esse

videas, quot illi dies et epactae praecedentis cicli Kalendas pariter fiant in illo die tunc praesenti tot lunae aetates fore spectabis. 2. Si magis quam xxviii in mensibus quorum luna vigesima nona fieri debet, vel si maius quam xxx in aliis mensibus numerus inveniatur, illis sive illis praedictis numeris expulsis, tot lunae aetates ipsius tunc praesentis cuiuslibet diei, quot remanserint, erunt. Sed lunae embolismi quando inter hos vicissim currentes numeros, hoc est xxviii atque xxx intervenire contingit, ne te fallat observa. Ac ne te fallerit istius sive illius mensis luna quando in solito more in alterum intraverit.

CAP. VI.

1. En hoc ius finit hic, en et idem incipit hoc ius,
Nunc narrari aliter non ut narravimus ante.

Si eandem item rationem aliter scire videris, aetates lunae quotquot fuerint, in antecedenti die Kalendas Aprelis, quotcumque diebus aut a Kalendis praedictis, sive nominatione solis mensium coniunge, illos omnes numeros cumulos per lviii divide, si alii minus quotlibet quam xxx remanserint, tot lunae aetates in illo die erunt. Quod si magis quam xxviii esse videris numerum quem quaeres dum pepuleris xxviii. Si saltum sic monui caveas congrue iam semper invenies.

CAP. VII.

1. Hoc opus hic tridui modo sic finire cupivi.
Prosa modo finit rithmus nunc incipit esse.
Gaudeo transiisse latos in campos prosae,
Viam perlustrans plene loquelae spaciosae,
Ut vitulus solutus vinculis obligatus,
Metro relicto sanus vagus sum liberatus.
Introibo sed rursus liberum post excessum
Metri quidem conclusum quamvis angustum gressum.

CAP. VIII.

1. Consumptus rithmos metrum nunc incipit inde.
Iam nunc inveniens nosces, errore repulso,
Aetates lunae, lunae per tempora trina,
Non solum aetates lunae seu lumina mensis
Per haec, sed breviter divinum pascha videbis,
Si servare velis Aprelis lumina quinta,

- Paschali luna numquam quae rite carebunt,
 Ceu non praetereunt Aprelis lumina lunae,
 Namque eadem pascae semperque Aprelis habetur,
 Cum vere semper primum sit perpera luna
 Pasca id quam veniat quod pellit perpera longe,
 Quae causae adventum pascae iam sola futuri
 Expellens tardat postrema in tempora veris,
 Martisque in spatio post quintum lumina bina
 Semper habent lunam dantem ieiunia prima.
 Si vis serva unum, si vis servabis utrumque,
 Ambo haec praedictam lunam quia semper habebunt,
 Prima diem primum tenet, ultima luna secundum,
 Ultima nec primumque tenet, nec prima secundum.
2. Sic quando incipient pasca et ieiunia nosces ;
 Non alias umquam brevius haec scire valebis.
 Quid brevius quam pasca diem explorare per unum ?
 Inter quinque ter et septem ter lumina pascae,
 Inter tres semel ac tres ter ieiunia sume
 Aetates lunae, discernens omnia iura.
 Si minus aetates quam quinque ter esse futurum,
 Maius quam septem ter si sint ante peractum
 Pasca dies, breviter semper hic enim ordo manebit.
 Si minus adfuerint una ter scito futura.
 Si plus quam trinas ter prisco lumine cernas,
 Esse prius semper nosces ieiunia coepta.
 In his praedictis aetatibus ordine septem
 Quaere diem domini primum quem mundum habebat,
 Ut facias in eo domino iam pasca sacratum.
 Una dies binos praedictos regula vincit
 Ieiunii spatii ante dies quot primus habebit,
 Post bis sex lunae aetates tot pasca tenebit.

CAP. VIII.

1. Bissexturn et saltum memorans in utrisque caveto.
 Demit hic, ille auget medii positi inter utrumque
 Intransentem aetatem lunae ieiunia prima.
 Nunc pascae minuunt nunc addunt lumen utrique.
 Tunc saltus minuit cum ter sint lumina quinque.
 Bissexturnque addit dum ter sint lumina septem.
 Bissexturn demit praeter haec, saltus et auget,

Dumtaxat lunae pascalis lumina noctis.
 Si medii fuerint ambo in parte unius anni,
 Praedicta haud turbant recte communia iura.
 Sed cum bissextus solus praecedere possit,
 Iam tantum saltum sectans ieiunia prima,
 Ius commune perit inter sollemnia bina.
 Si prior adfuerit bissextus enim sine saltu,
 Nil contra invenies inter sollemnia clara.

CAP. X.

1. Mensis quando diem octavum ter videris Orci,
 Tunc bissextus erit, completis quattuor annis,
 Quinque bis atque tribus ter factis, saltus habetur,
 Postquam consumas septem ter lumina Martis,
 Aut praecedentis sexta in quater luce Novembris.

CAP. XI.

1. Vigintique dies nonies bis quinque semelque
 Annus cum quadrante tenet solaris in orbe.
 Annus enim lunae plus aut minus esse videtur,
 Denis atque novem est plus sex et quinque minusque.

CAP. XII.

1. Ciclus habet lunae quinos ter et quater unum.
 Ciclus habet solis senos quater et quater unum.
 Sol et luna simul dumtaxat longius annos
 Iam triginta duos quingentos ordine complent.
 Si saltus penitus, si bissextusque periret,
 Centenos quinos idem bis ciclus haberet,
 Nam sol septem annos luna ac triginta teneret.
 Si saltus fieret, si nec bissextus adesset,
 Tres in ciclo anni centum triginta manerent.
 Si bissextus item sine saltu stare valeret,
 Octingentos atque decem quater esse pararet.
 Si pariter faciant sol ciclum indictio luna,
 Si mille et centum si quadragintaprehendens,
 Per septem rursus quis multiplicaverit istic,
 Inveniet numerum cicli per cuncta locandum.

2. Vera canam linqvens qui non sunt fingere ciclos,
 Sicut ab Apreli prima argumenta canebam,
 Incipiens luna eiusdem sic sum ista praefatus,
 Ut lunam Martis hic per ieiunia cernes,
 Sic lunam Aprelis semper pasca videbis,
 Sic mensem atque diem lunam ieiunia pasca
 In his ac primis doctrinis porro videbis.

CAP. XIII.

1. En idem versus iterum ludi arte moventur,
 In semet bini ac bini velut ante quaterni,
 Iam voscum facerem hos ignorans ante tacebam
 Esse valere quidem tot multos agmine parvo.
 Propter hoc ponam distincte utrosque seorsum,
 Ut breviter monui novies bis carmina prima,
 Ter decies atque undecies semel ista movebo,
 Bis quater ut sint viginti bis bina iterumque
 Si varians fieret tantum finis bis in istis
 Ter centum et septem quater octos esse pararent.
 Spondeus si est et motus bis per loca quina
 Mille et sexcentos denos quater esse pararet.
 In qui versiculi starent, quot praememoravi,
 Per metri leges, alii per iura movendi
 Prosae seu rithmi metri qui lege soluti
 Mille ac trecenti duodeni rite manerent.
 Communis prosae quamvis non ordine tantum,
 Aut rithmi starent quoniam sic fame vere
 Non solum numerum servant sed tempora certa.
2. Francorum rector multorum, inclyte cantu,
 Si avus et proavus regni praecepta gubernans,
 Alti inclinato montes nunc sole rubescunt,
 Atque imae nigris valles replentur ab umbris.
 Quattuor incipiunt praescripti in fame primo.
 Tempora ferventis velocis cernite solis
 Roscida servantes tardantis lumina lunae
 Menstrua metimur longos per sidera ciclos
 Lucida mutatis miscentes famina verbis.
 Quadraginta unum quater aut bis carmina bina
 Distincta incipiunt per bina ac binae seorsum,
 Quae scriptus numerus si linguarum ante nec esset

Viginti novies fierent equidem et semel octo,
 Nec licet hi vellem versus plus esse valerent,
 Linguarum in numero tantum quia sex quater extent,
 Hic qui debuerant inter hos esse manentes,
 Inter eos primo fierent nisi connumerati.

3. Roscida velocis servantes lumina solis
 Tempora tardantis ferventis cernite lunae
 Roscida tardantis ferventis cernite solis
 Tempora velocis servantes lumina lunae
 Roscida servantes velocis cernite solis
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Roscida ferventis servantes cernite solis
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 Tempora ferventis servantes cernite lunae
 Cernite velocis servantes tempora solis
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 Cernite tardantis ferventis roscida solis
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Cernite servantes ferventis roscida solis
 Lumina velocis tardantis tempora lunae
 Cernite ferventis servantes roscida solis
 Lumina tardantis velocis tempora lunae
 Lucida per longos mutatis famina verbis
 Menstrua miscentes metimur sidera verbis
 Lucida miscentes metimur sidera ciclos
 Menstrua per longos mutatis famina verbis
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 Hic ludus finit, felix Auguste, valetō.
 Rusticane scribant has membra caveto loquelas.

4. Quattuor hos versus iterum si multiplicarem,
 Hoc est coniuncti simili si more manerent
 Tertius et primus, si tertius atque secundus,
 Quartus cum primo mixtus foret atque secundo,
 Dupliciter tantos possent contexere versus,
 Quantos texuerant primus pariterque secundus,
 Tertius et quartus commixti rursus in unum,
 Id centum ter viginti semel et semel octo
 Praescripto numero versus sic addere possent.
 Sed melius facimus brevius quod possit haberi
 Monstrantes fieri maius quo iure valerent.
 Dulce sonat parum, confert fastidia magnum.
 Sit satis idcirco quod feci, Auguste, valetō.
 Ni mihi praedictos iubeas hos scribere versus,
 Ut quingenti viginti ter et quater unus
 Postremi et medii ac primi simul agmine starent,
 Facti ex praescriptis binis bis versibus istis,
 In quis non plus mutantur quam parabis octo
 Vel septem atque decem partes hoc more loquelaē.
5. Si per constiterit per se ceu diximus ante
 Primos linguarum numeri iam nomino versus
 Hos medios facti, qui sunt hic ac numerati,
 Cum primi haud solum possent non esse minores,
 Sed nimis in numero maiores esse valerent.
 Quam constant isti versus per cuncta movendi
 Linguarum in numero volui finire laborem.
 Quattuor omnino, quae sunt in partibus orbis,
 Nam facti starent, si iura per omnia moti
 Paene idem versus et in illis unus ac alter
 Quisque legat sicut hoc saepe videbit in istis,
 Quod magis haud distant uno quam nomine tantum,
 Qualibet aut alia una distant parte loquelaē ;
 Quod ius in primis cernes contingere raro,
 Quattuor una quod maius quam bina seorsum
 Bina iterumque valent variari posta seorsum,
 In metri pedibus simile huius iuris habetur,

- In binas partes postquam disiunxeris aequas
 Quattuor ipse pedes, et si divideris octo,
 Multiplicans illas partes utrasque seorsum,
 Octo ex quattuor, ex octo triginta duosque,
 Primis bis cum octo ex postremis bis quater octo.
6. Si pariter fuerint, facies per cuncta movendi
 Primos bis binos postremos dicimus octo.
 Quattuor ob hoc non volui variare per omne
 Multiplicans partim diversa per omnia iura,
 Nam, si plus facerem, fastidia magna pararem.
 Cuncta modis aliis potuissent ista moveri,
 Si interdum primus, si interdum nempe secundus,
 Si interdum quartus, si interdum tertius aequae
 Iam demptus fieret, facerent tres carmina multa,
 Ut starent pariter dumtaxat milia multa,
 In quis plene idem non essent unus et alter.
 Sed haec sufficiunt, tantum quae scribo videto.
 Si plus scire velis, praeter haec scire valebis
 Haec scrutans eadem simili iam more videnda,
 Aut obscurum aliquid vobis si forte putetur,
 Cum praesens illud fuero narrare valebo.
7. Augusti filii, Lhudoice Auguste, valet.
- Si Augustorum pater utrique ante manebat;
 Multorum genitor David per tempora longa.
 Post octingentos domini et post quinque ter annos,
 Anno in praeterito promissum suscipe donum,
 Hoc tibi si placeat, rursus addam munera pulchra.
 Lumina tardantis rorantis cernite lunae,
 Tempora velocis servantes fervida solis,
 Ter triginta duosque bis hi contexere bini,
 Possunt hos, si quisque velit, variare per omne.
 Altera ab undecima fugiens nunc luminis hora,
 En tenebrae veniunt, animalia multa quiescunt.

CAP. XIII.

1. Ceu tesserae in pyrgis mutantur ludificis,
 Sic hae partes in istis moventur versiculis.
 Pulcherrimam auream non habeo aleam;
 Aleas quas habeo tibi donare volo,
 Domino caeli gloria atque terrae perpetua.

LIBELLUS TERTIUS.

CAP. I.

1. Tertius incipiet tandem nunc nempe libellus
Stellarum ciclos lunae solisque revelans,
Atque diem primum iam naturaliter anni.
2. Diversos ciclos solis lunaeque canebam,
Stellarum errantium ciclos volo dicere quinque,
Quas aiunt alii esse deos alii esse deorum
Pagani atque deae signantes nomine stellas,
Mercurii Martis Veneris Iovis et patris eius,
Quem Caelo genitum Saturnum nomine fingunt.
Per binos annos Mavortis stella vagatur ;
Stella Iovis cursum duodenis finit in annis ;
Ter denis annis Saturni volvitur astrum ;
Mercurii sidus ciclum implet porro diebus
Centenis tantum ter denis ter semel octo ;
Viginti septem subtractis solis ab anno
Stella valet Veneris cursum finire diebus ;
Ter centenis ac denis quater et semel octo
Sublatis anno denis septemque diebus,
In firmamento caeli cum sidera fixa
Cuncta simul complent cursus, iam solis in anno,
Orbis terreni circum volventia rura,
Ter centum ter viginti vicibus semel et sex,
Cum caelo simul, ut veteres aiunt sapientes,
Plus una vice quam circum sol volvitur in anno,
Orbis rura eadem terrae ortu solis in ortum
Viginti novies bis quinque semelque diebus
Annalem cursum implens, et, quadrante sequente,
Sic septempliciter iam quinquaginta per orbem
Luna duosque semel circumdat cursibus orbem.

CAP. II.

1. Post haec plene orbem circum haud luna peragrat, luce in
postrema solaris totius anni.

De luna dicam, de stellis ante locutus.
Per denos annos cursum complente novemque,
Iam praeter succedentum titulos rationum.
Nunc metrum linquens, per prosam porro profabor.
Planius ut fiant discenti quaeque sequentur.

2. Scire volueris cur in octo et undecim annis, ac non potius in novem atque decem propius ad aequalitatem annis, ciclus decennovenalis distingitur. Tribus causis hanc licet magis disparem fore divisionem intellegere debes.

3. Prima causa, eo quod veteres errando octo annos solares totidem lunaribus annis, et undecim solares similiter lunaribus undecim annis aequari putabant. Quod numquam fieri posse manifeste videtur. Quasi luna semel in octo annis suum vere ciclum terminasset, nequaquam alterum ciclum in aequalem habere quivisset, tantumdem si in undecim annis ciclum veraciter umquam consumpsisset, numquam alterum dissimilem possidere valeret.

4. Secunda causa, quod ogdoas ac endecas ante novissimum embolismum, non duos communes anno, sed insolito more unum tantum habeant.

5. Tertia, quod quarta decima luna paschalis in quocumque die mensis in ogdoade fuerit, in sequenti duodecimo anno in praecedenti die continente semper inveniatur. Sicut, consumptis tribus annis endecatis, quartadecima luna paschalis in quocumque die mensis eiusdem endecadis inveniatur, consequenti die in nono anno insequenti die continente semper reperitur. Nam, in quocumque die in tribus solum modo primis endecadis annis, quartam decimam lunam paschalem habueris transiliens sequentem continentem diem in nono sequenti anno eandem lunam quartam decimam absque dubio reperies. Sic, transactis undecim annis, in duodecimo anno si retrorsum unum transilias diem, praedictam lunam sine errore palam fore videbis.

6. De lunae cursu in ciclo ante minore loquebar.

De cursu eiusdem ciclo in maiore profabor.

Postquam de cursu lunari in decennovenali ciclo manifeste digessi, de cursu quoque rursus lunari per ciclum dxxxii annorum, quantum brevissime palamque potuero, narrabo. 7. Primum hic nuntiabo, quod magnus ciclus praedictus, in quo omnia sidera legimus cursus omnino suos complere, in quattuor divisiones custodientes, solis etiam quodam modo et lunae concordiam dividitur, hoc est, in nonaginta quinque annos tribus vicibus, ac in cexlvii semel quidem semper annos. Qualiscumque etenim dies mensis atque aetas lunae in dominico die pascali fuerit. Si primum pasca post bissextum evenerit, completis iterum ducentis xlvii solis ac lunae plene annis, tandem mensis diem lunaeque aetatem in pasca eandem fieri absque errore quisque probabit. Sic item quamcumque mensis diem ac lunae aetatem secundum vel tertium aut quartum pasca post bissextum habuerit, easdem certe rursus xcv solis atque lunae simul annis finitis semper habebit.

CAP. III.

1. I. De quattuor ciclis in ciclo solis et lunae.
- II. De magno ciclo post bissextum.
- III. De magno ciclo per quattuor loca mutato.
- IIII. De versibus et ciclo.
- V. Quomodo vigies octies in septimana xiiii luna.
- VI. Post quintum ciclum ordo lunae sextae ac septimae.
- VII. Recapitulatio communiter.
- VIII. Inter duos decennoventaes quot transilias annos.
- IIIIII. Quod quintus decennoventaes semper a bissexto incipit.
- X. Quod inter duos decennoventaes unum diem duorum de concurrentibus transileas.
- XI. In quoto die sit pasca communis anni ante adventum diei mensis, in quo fuit pasca praecedentis anni, et in quoto die fit pasca embolismi anni post transitum diei mensis, in quo fuit pasca praecedentis anni.
- XII. In quot annis in uno quoque ciclo decennoventali eadem aetas lunaris iterate in pasca invenitur.
- XIII. In quali ordine unaquaeque pascalis aetas reperitur.
- XIIII. Quo ordine annorum solanus cyclus principium sumens ab omnibus annis decennoventalis in magno circulo communi solis omnino ac lunae incipit, et quo similiter ordine decennoventalis circulus ab omnibus annis solaris cycli in eodem ciclo magno praedicto incipit.

2. II. Secundum ius narrabo. Quod si pasca primum, ut est nunc, post bissextum fuerit, completis iterum cexlvii annis, id est xiii ciclis decennoventaes, transiliens quasi duos annos, hoc est secundum tertiumque post bissextum in quarto bissexti praeparationis anno pasca semper aderit. Quin cum pasca in secundo sive tertio seu quarto quidem anno post bissextum adsit, consumptis xcv annis, id est quinque ciclis lunaribus, transiliendo similiter quasi duos annos eiusdem cursus bissextilis, in eadem mensis die eandem aetatem lunae habente, idem pasca adesse spectabitur. Hoc est, si in quarto praeparationis bissextilis anno factum pasca advenerit, praeteriens primum ac secundum, in tertio praeparationis bissexti anno post praedictos etiam ciclos pasca eiusdem rationis adfore videbitur. 3. Si autem in tertio bissexti pasca adfuerit anno, quasi transactis quarto ast primo bissexti, in secundo, finitis ciclis praememoratis, idem aequaliter celebrabitur. Dum in secundo bissexti anno constiterit, quinque

lunaribus ciclis postea terminatis, quasi tantum duos praetereundo annos in primo bissexto anno sine dubio reperitur.

4. III. Tertia quidem ratio hic fieri videtur, quod maior ciclus his quattuor praedictis, id est qui cxxlvii annos habet, certum locum possidendi inter eos ordinaliter servat. Quia quando prima pascha post bissextum fuerit, ab illo statim iste ciclus incipiet. Cum secundum pascha post bissextum occurrerit, post unum de praedictis ciclum, hoc est post xcv annos, initium sumet dum tertium a bissexto advenerit, tertio loco erit. Quando quarto loco bissextum pascha sequitur, quarto, id est novissimo ordine adveniet.

5. IIII. In quarto loco versus et ciclus, illos hic sequens, scribendo continuo succedunt.

Prosa tacens istie monstrabit cetera metrum.
 Arte nova parvum ciclum conscribo gregatum,
 Rite revertentem semper sic vis in id ipsum,
 Qui poterit lunae et solis servare recursus,
 Amborum cicli retinens paene omnia iura,
 Luna diesque eadem mensis feriaeque manebunt.
 Idem omnis saltus bissexto non erit idem.
 Tantum cum veniat pascae bis septima luna,
 Transactis semper ciclis, quos diximus ante,
 In ciclo lunae et solis cum quinque manent haec,
 Plene his ex bis unum tantum modo derit in istis,
 Hoc est, quod fuerit bissexto cursibus annus,
 Luna dies feriae saltus hic ordine tantum
 Concurrent pariter, stabili ratione vigente,
 Quattuor ut maneant, uno istie iure relicto,
 Cum decies noviesque manebit linia sueta,
 Transversa undecies descendet linia cicli.
 Hic finit metrum, hic exordia ciclus habebit.

6. Concurrentes septimanae dies in prima videlicet linia transversa erunt. Numerus transiliendorum ciclorum in duabus porro liniis transversis novissimis erunt.

ae XIIII	in pri-	In II	In III°	In IIII°	In V°	In VI°	In X°	quot	quot
lunae	mo de-	decen-	decen-	decen-	decen-	et VII°	atque	decenno-	decenno-
pas-	cenno-	noven-	noven-	noven-	noven-	VIII° que	XI° ac	vennales	vennales
ca-	venna-	nali	nali	nali	nali	et VIII°	XII°	tran-	tran-
les	li haec	haec	haec	haec	haec	decenno-	ast XIII°	si-	si-
	linia in-	linia	linia	linia	linia	nali haec	decen-	lis	lis
	cipit	incipit	incipit	incipit	incipit	linia incipit	novena- li haec linia incipit		

non Apl.	xx	xviii	xv	xviii	xvi	xxi	xxvii	.	iii
viii Kl. Apl.	xvi	xx	xviii	xv	xviii	xxi	xvii	i	iii
idem Apl.	xvii	xxi	xviii	xvi	xx	xviii	xv	ii	iii
iiii non Apl.	xx	xvii	xxi	xviii	xvi	xviii	xv	iii	iii
xi Kl. Apl.	xv	xx	xvii	xxi	xviii	xvi	xviii		iii
iiii idem Apl.	xvi	xx	xviii	xv	xviii	xxi	xvii	i	iii
iii Kl. Apl.	xviii	xvi	xx	xviii	xv	xxi	xvii	ii	iii
xiii Kl. Mai.	xx	xvii	xxi	xviii	xvi	xviii	xv	iii	iii
vii idem Apl.	xv	xx	xvii	xxi	xviii	xvi	xviii		iii
vi Kl. Apl.	xviii	xv	xx	xvii	xxi	xvi	xviii		iii
xvii Kl. Mai.	xviii	xvi	xx	xviii	xv	xxi	xvii	ii	iii
ii non Apl.	xv	xviii	xvi	xx	xviii	xxi	xvii	iii	iii
viii Kl. Apl.	xvii	xx	xviii	xvi	xx	xviii	xxi		iii
ii idem Apl.	xviii	xv	xx	xvii	xxi	xvi	xviii	i	iii
Kl. Apl.	xxi	xviii	xv	xx	xvii	xvi	xviii	ii	iii
xii Kl. Apl.	xvii	xxi	xviii	xv	xx	xvi	xviii	iii	iii
v idem Apl.	xvii	xv	xviii	xvi	xx	xviii	xxi		iii
iiii Kl. Apl.	xx	xvii	xv	xviii	xvi	xviii	xxi		iii
xv Kl. Mai.	xxi	xviii	xv	xx	xvii	xvi	xviii	ii	iii

7. Sed in ciclo isto aliquid inditum contra cunctorum naturam ciclorum pascalium reperitur; quod, cum in uno quoque ciclo decenno-vennali septem semper aetates pascales inveniantur, in sexta linia pascalium aetatum huius cycli non amplius diverse quam quattuor aetates lunares veraciter habebuntur, ac aequaliter totidem aetates in eiusdem linia septima.

8. v. Quinta ratio primo post ciclum necessario succedit, ut quomodo decennovalis ciclus dxxxii annorum ciclo vigies octies iteratur lucide cognoscatur. Cum fit pasca quater ab unaquaque quarta decima luna, in unaquaque die de septem illam sequentibus, vigies octies in unaquaque septimana ab unaquaque xiiii luna idem foreprehenditur; ut facile intelligatur quo modo fit hoc, quod nunc dico, exemplum ostendam.

9. Prima luna quarta decima primi cycli decennovalis in solis lunaeque pariter ciclo, qui, completis dxxxii semper annis, omnino terminatur in die, verbi gratia, lunae quater praedictis equidem intercedentibus spaciis, occurrit.

Prima luna xiiii secundi cycli decennovalis quater similiter Mercurii die invenitur. Prima xiiii tertii cycli quater aequaliter Saturni die. Prima xiiii quinti quater tantumdem in die Veneris. Prima xiiii sexti, ut alius prope cycli succedentis, quando non a primo post bissexti pasca haec septimanae ratio incipit, quater eadem iure in Dominico die reperitur. Prima xiiii alius prope semper cycli sequentis quater eadem ratione in Iovis die. Sic etiam unaquaque luna xiiii in septem sequentibus illam diebus; quamquam non eodem ordine dierum septimanae, quem dixi pasca in praedicto vigies octies ciclo occurrere, facit.

10. vi. Sextum hic invenies, quod in unaquaque linia praecedentis huius cycli a nobis investigantibus diligenter congregati primum numerum in primo decennovali post bissexto habente, sextus numerus si necesse fuerit, ut corrigatur, nullum transiliens post quintum decennovenalem in sexto ciclo reperietur. Quia in secunda post bissexto linea in hoc congregato ciclo a quinto numero ad quaerendum sextum, unum decennovenalem, quisque scire voluerit, transiliat, ut in septimo illum decennovali inveniat.

11. In tertia post bissexto linea duos praetermittat, ut in octavo numerum quem quaerat, inveniat. In quarta post bissexto linea ii praetereat, ut in nono decennovali sextum numerum lineae numeri congregati cycli certa fieri videat. Quin a cyclis sexti numeri iii decennovenales necesse est transilitur, ut septimum numerum primae post bissexto liniae congregati cicili in decimo decennovali.

Secundae post bissextum liniae in undecimo. Tertiae post bissextum liniae in duodecimo. Quartae post bissextum liniae in tertio decimo decennoventali semper inveniatur.

12. VII. Hoc magis in omnibus quae praedixi de hoc congregato ciclo communiter memorato. Quod etiam quot numerus liniarum fuerit a principio decennoventalis primi cuiuscumque ex praedictis rationis ante liniam quaecumque habet numerum de quo inquiras, tot numerum liniarum reperies ante liniam, in qua idem numerus in quocumque decennoventali secundum intercedentem spaciorum regulam in magno ciclo praedictam sine dubio manet.

13. VII. Hoc itidem in ciclo solis et lunae generaliter fieri scire memento, ut inter duos decennoventales semper, sicut de altera videlicet ratione praediximus, quasi duos bissextilis cursus annos transilias. Nam, si primus cuiuscumque decennoventalis annus continuo post bissextum fuerit, praetermissis secundo ac tertio ab anno bissextilis iuris, quarto sequens alter decennoventalis incipiet.

14. VIII. Et cum decennoventalis a bissexto primordium suscipiat, transactis tribus decennoventalibus mediis, semper quintus a bissexto initium sumet.

15. X. Si in primo quoque anno post bissextum in exordio decennoventalis concurrentes septimanae dies, verbi gratia in die Mercurii fuerint, transilient unum diem in primordio sequentis decennoventalis, in die Veneris erunt. In aliis enim tribus semper annis duos transilire dies in omnibus decennoventalibus conserva.

16. XI. Undecimam rationem hic equidem expediam, quod sicut indubitabiliter in communibus semper annis praeter primum decennoventalis, ut scitis, annum quarta decima luna paschalis in undecimo die ante adventum diei mensis, in quo quarta decima luna paschalis fuit, anni praecedentis invenitur. Ac veluti in omnibus embolismis annis in nono decimo die post transitum diei mensis, in quo xiiii luna paschalis in anno praecedente fuerat, eadem reperitur.

17. Ita canonica anchora, contemptis errorum fluctibus, ante et post certum dierum numerum dominicum pascha retinet. Quin si pascha cuiuscumque praesentis anni communis lunam xvi habuerit, non praecedente bissexto, in quinta decima die ante adventum diem mensis, in quo pascha praeteriti anni praerat, sine dubio esse videbitur. Quia, quando bissextus praecesserit, non in xv, sed in xvi die ante praedictum diem pascha illud fieri probabitur. Sin autem xviiiimam, seu xx lunam, sive quidem xxi in anno communi habeat, sine praecedente bissexto in octavo die ante adventum diei mensis

paschae praeteriti. 18. Si autem bissextus praecesserit, non in octavo, sed in xviii die pascha illius cuiuscumque communis anni fore cognoscitur. Quando etenim xvma luna in pascha communis anni fuerit, praedictorum numerus dierum diverse videlicet accidit. Namque si bissextus nec praecesserit, in quinta decima semper die ante diem mensis, in quo fuit praeteritum pascha, habebitur. Nam, cum bissextus praeierit in nono etiam die antequam praedictus dies mensis adveniat, absque dubio erit, nisi tantum quando in primo decennovenalis anno post bissextum xvii luna in pascha fuerit, tunc enim in xvi dies ante adventum diei, in quo praecedens erat pascha, sollemnis dies Anastaseos praesentabitur; quod semel in ciclo dxxii annorum, hoc est in xxv decennovenali, id est anno dcccclxxxviii ab incarnatione dominica completo evenit.

19. Cum vero xviii luna in pascha communis anni fiat, bissexto antecedente, semper in nono die. Quando autem sine bissexto, in octavo saepe die. Raro videlicet in quinto decimo priusquam veniat dies mensis paschae praeuentis anni sollemnitas sollemnitatum reperietur. Sed pascha tale in nono et octavo die tantum fit, cum praecedens pascha non habuerit nisi quintam decimam lunam. Namque in quinto decimo die praedictum hoc pascha in primo solum modo decennovenalis anno aderit. Quando praeteritum pascha non sequente bissexto vigesimam primam lunam possiderit, hoc est in primo anno secundi decennovenalis et septimi ac duodecimi tantum modo cycli.

20. Regula communium diligenter annorum investigata, ad embolismorum discutiendam rationem transeamus.

Pascha certe embolismi anni si non praecedat illud, bissextus post transitum diei mensis, in quo fuit praecedens pascha, in vigesimo die invenitur. Namque quando ante pascha embolismi bissextus fuerit, post transcensum diei mensis, in quo fuerat praecedens pascha, non in vigesimo sed in nono decimo die ipsum reperietur. Sed cum pascha praecedentis communis xxi lunam habuerit, non subsequens bissextus post transgressum diei mensis, in quo illud erat xiii^o die, succedens embolismi pascha xv lunam habens fieri videbitur. Quin si inter utrumque pascha praedictum bissextus adfuerit post transitum diei mensis pascha praecedentis, non in xiii, sed in nono decimo semper die, habens lunam non xv sed xxi embolismi anni pascha subsequens inventum erit.

21. XII. Duodecimum ius praememorati cycli nunc narrare conabor. Cum decem novemque sint anni in unoquoque ciclo lunae, in quo lunaris aetas non magis quam septies in dominico die pascali variatur, quomodo in omnibus decennovenalibus per cyclum dxxxii annorum

septem lunae equidem aetates inconfuse ordinantur in pasca, quem ad modum solis ciclus per septem quadriennia secundum bissextilem rationem dividitur. Ita solis ciclus ac lunae pariter in septem partes convenienter partiri potest, quarum unaquaeque pars quattuor decennovenales possidet, et primus annus primi decennovenalis uniuscuiusque partis bissexto semper incipit. Ita quintus decennovenalis, ut praedixi, cum bissexto simul semper incipit.

22. Dum dispar sit annorum numerus in decennovenali ciclo numerusque lunarium aetatum in dominicis diebus pascalibus, quo videlicet ordine lunaris aetates septem tantum in decem ac novem annis in vice mutantur, iterate hic verbis nunciabo. Cum septem aetates in unoquoque decennovenali fiant in pasca, aliae ex eisdem aetatibus semel, aliae bis, aliae ter, aliae quater, nec plus in pasca fiunt. In primo etenim decennovenali uniuscuiusque partis una quidem aetas ter ac aetates quae quater, et ex quattuor ceteris unaquaeque bis. In secundo decennovenali quae quater, totidemque ter, ac duae bis, at una semel. In tertio tres solum modo quater, ac tres bis, unaque semel. In quarto tres aetates ter, et una quater aetas. Ast tribus reliquis unaquaeque bis in pasca invenitur. Sicut aetates singulae, quas esse diximus in secundo atque tertio decennovenali, uniuscuiusque partis in fine duodecimi anni decennovenalis semper, hoc est in fine quarti tantum endecadis fiunt in pasca. Sic fere eodem ordine inter se in secundo tertioque ciclo cuiusque partis eadem aetates unicae velut binae titulatae liniae subsequentes ostendent. In dominico die pascalei concurrunt, quas nunc ordinaliter subsequenter hic scribo :

xviii.	xv.	xviii.	xxi.	xvii.	xx.	xvi.
xvi.	xviii.	xv.	xviii.	xxi.	xvii.	xx.

Septem numeri primae huius liniae ad secundos ciclos septem omnium partium pertinent, septemque aequaliter secundae liniae ad totidem tertios.

23. Post haec scire debemus quod aetates, quae certe bis vel ter in quocumque decennovenali fore in pasca praediximus, non in annis pariter coniunctis, sed sparsim separatis semper in eo fiunt. Nam aetates etiam, quae quater in secundo seu tertio sive quarto cuiusque partis ciclo inveniuntur, in duobus annis iunctis et in aliis duobus disiunctis in pasca fiunt. Sic una quidem aetas in primo semper ciclo cuiusque partis in praememorata sollemnitate reperitur, quoniam altera aetas in secretis sparsim annis quattuor in eodem die occurrit. Sed cum aetas eadem in duobus pariter annis esse in pasca conspiciatur,

memento quod primus annus communis sit, et sequens embolismus, intercedente inter eosdem bissexto; quia, si bissextus non intervenerit, maior una aetate in pasca embolismi quam communis aderit. Nisi tantum quando pasca communis anni xxi lunam habuerit. Tunc enim sequentis embolismi pasca, non praeveniente bissexto, quintam, decimam lunam possidebit.

24. XIII. Tertiam decimam rationem hic cognoscere debemus, quod in quot locis emendatae paginae primi cicli decennovenalis iterata fuerit pascalis aetas lunae, utrum bis an ter aut quater. In eisdem tot locis primi cicli cuiusque aetas semper alia lunae pascalis diei inventa erit. Verbi gratia, ut in prima quarta octava et octava decima linia primi cicli quem doni suis exiguis optime primum scripserat, xx luna consistit. Sic in eisdem locis earundem liniarum in cunctis primis ciclis omnium partium, id est in quinto et nono ac tertio decimo ac septimo decimo atque vigesimo primo ast vigesimo quinto. Alia semper aetas una lunae in unoquoque ex praedictis ciclo in pasca eodem modo reperta videbitur. Ita cunctae aetates pascales, quae fiunt in primo ciclo qualicumque modo in illo fuerint, eodem tali modo locorum mutatae aetates in sex aliis praememoratis ciclis eiusdem ordinis erunt.

25. Sic nempe in quibuscumque liniis aetates in secundo ciclo primae partis manserint in eisdem liniis in secundo ciclo cuiuscumque partis, hoc est in sexto ast decimo, quarto decimo, octavo decimo, xxii et xxvito immutabiliter. Aliae aetates eodem ordine constabunt. Aequaliter in quocumque ordine in tertio ciclo primae partis illas invenias. In eodem ordine in tertiis ciclis partium, id est in septimo, ast undecimo, ac xv, ac xviii, ac xxiii, xxvii que reperies. Et sicut in quarto ciclo primae partis videas, ita in octavo, xii, xvi, xx, et xxiiii, atque xxviii cernere semper poteris.

26. Exinde facere volumus ut cognoscas quod cum sint quatuor aetates pascales, quae numquam nisi bis fiunt in pasca, in decennovenali primo cuiusque partis postquam fuerit unaquaeque semel ex eis in pasca, hoc est in secundo, et septimo, ac x, atque xv decennovenalis anno, transiliens iii annos in fine quarti rursus eam semper invenies. Una aetas, quae ter in unoquoque ex eisdem septem ciclis praedictis in pasca fit, dum semel in pasca fuerit, id est in quinto decennovenalis anno, transiliendo tres annos in fine quarti anni, et rursus transiliens ii in fine tertii in pasca reperietur. Cum duae aetates fiant quater in praedicto spacio in eodem die, una in annis separatim sparsis, altera in duobus disiunctis et in duobus aliis conglutinatis, illa quae fit sparsim in primo anno cicli clarescens,

consumptis duobus in fine tertii, rursusque terminatis tribus in fine quarti, et iterum finitis novem in postrema parte decimi anni in pasca reperitur. Altera in tertio incipiens anno cicli, transactis novem ac rursus terminatis duobus, in tertio simul et quarto in pasca anno manifestatur. 27. In secundo ciclo cunctarum partium duae bis fiunt aetates, ac duae ter, totidemque quater in pasca. Ex illis, quae bis fiunt una quae primum in septimo fulget anno, consumptis annis tribus, in quarto novissimo occurrit. Nam illa, quae in tertio anno primo manifestatur, duodecim transactis annis, in tertio decimo rursus ostenditur. Ex binis, quae ter apparent, una in quarto perseverans anno transiliens primo tres atque iterum novem in pasca ter invenitur. Quoniam altera, quae in primo reperitur anno, consumptis xiii, in quarto decimo fieri monstratur, transiliendo tres iterum illa refulgens in quarto fore videtur. Ex duabus, quae fiunt quater, unam in secundo incipiente anno, alteram in decimo consumens duos annos in tertio simul et quarto et iterum duos alios transiens in tertio lucentes aequaliter esse specularibus, utramque inter octo annos aetatem conclusam inspiciens.

28. In tertio quoque ciclo per omnes partes tres aetates in pasca bis splendentes manifestantur. Quarum prima in quarto, secunda in quinto, tertia in tertio decimo primitus inventa anno. Finitis annis tribus iterum in eodem die in fine quarti reperiuntur anni. Aliae ternae, quae quater in eodem ciclo permanent, diversa intercedentium spacia prorsus habent annorum, una etenim in secundo cicli anno tertioque pariter occurrens, relictis duobus, in tertio, rursusque transcens novem annis, invenitur in decimo. Alia in primo possidens anno pasca, transactis xiii, in xiiii^o, ac iterum duobus terminatis in tertio quartoque simul fore manifestatur. Item alia aetas in septimo primum consistens anno cum consumpti fuerint bini anni in tertio una et quarto fieri monstratur, atque relictis iterum duobus, in tertio reperta inter octo coartatur annis.

29. In universarum partium quarto ciclo tres aetates bis totidemque ter et unam quater fieri in pasca cognoscimus, ex quibus quae fiunt bis, una in quinto anno, altera in decimo primitus permanens, praetereundo tres utraque invenitur in quarto. Quoniam quae in primo decennovennalis anno perseverat, si xvi transcendas annos illam rursus in xvii reperies. Certe tribus aetatibus quae ter iterantur una, quae in secundo cicli anno apparere incipit, consumptis primo tribus annis, in quarto fulgescens, ac iterum viiii transactis, in xmo resplendet. Aetas quae in tertio incipit anno, terminatis e contrario viiii, reperta in xmo, et rursus tribus relictis in quarto esse conspicitur. Ea quae

in duodecimo primum perseverat anno, finitis iterum duobus ostensa in tertio. Si rursum tres transileas in quarto clarescit anno. Illa quae in quarto incipit anno quater in praedicto cum permanet ciclo, transcendens duobus, in tertio atque quarto invenitur anno, consumatis iterum aliis duobus, in tertio monstrata in ter octo annos arcetur.

30. Ita ut brevissime recolligam eviscerans memorando haec omnia renunciabo. Id est quod quotamcumque aetatem lunarem in quocumque anno primi decennovenalis cuiusque partis in pasca reperies. Transiliens duas aetates ordinaliter sequentes in rotali circuito, quaeque tertia sequetur in anno eiusdem ordinis in primo ciclo succedentis partis invenietur. Verbi gratia, in primo anno primi cicli primae partis vigesima luna in pasca fieri cognoscitur.

Exin praeteriens xxi lunam atque xviam in primo videlicet anno primi cicli secundae partis, sextam decimam fore videbis. Deinde transcendendo xvii et xviii in eodem anno tertiae partis, nonam decimam esse deprehendes. Dehinc praetermittens vigesimam ac vigesimam primam in anno praedicti ordinis quartae partis, quintam decimam constare speculaberis. Inde xviam ast xviam si transilias in eodem quintae partis loco xviam contemplari poteris; ex xviii ac xxiam transeundo in principio sextae partis, vigesimam primam habere non dubitabis. Deinceps xv, xviamque scilicet omittens in exordio septimae partis, xvii in pasca lunam consistere spectabis.

31. Sed sin versa vice in circulari ambitu easdem aetates retrorsum transileas, quot ciclos praeterieris, hoc est tres totidem semper aetates praetermittens, quartam congruam eidem rationi aetatem reperies. Verbi gratia, xx lunam in isto vel in illo quocumque habens anno xviii, et xviii, xviamque praeteriens, sextam decimam congruenter invenies. Ita si rursus xv ac xxi atque vigesimam omiseris, nona decima quarto loco convenienter occurret. Ita in septem ciclis primis decennovennalibus universarum partium praedictarum, in his cunctis per omnes eiusdem ordinis annos sibimet invicem respondentibus, pascales aetates vii certissima regula praescripta sine caliginosi titubatione dubii scrupulosa commoventur.

Sic aequaliter in vii ciclis omnium partium secundis inter sese convenientibus universalis eadem regula semper apparet. Nec non tantundem in tertiis aliis vii, nec minus aequè in totidem quartis eodem modo sic semper sollemnes aetates observare valebimus. 32. Quarum exemplum sequens, ut facilius praescripta intelligantur, in gyro rotae pariter ostendetur. Et in altera rotella omnes secundum naturalis numeri ordinem pascales aetates conglomerabunt. Ut aetates

naturalis numeri, quae transiliuntur inter duas quasque in priori rotula absque ingenii labore palam monstrentur, in secunda quae nunc hic statim sequuntur, et aetates quoque quae ter et quae quater in praedictis ciclis fiunt, post istas rotas binas confestim titulatae succedent. Ita ut quae ter fiunt per T, et quae quater per Q, tantum modo praescriptis earum numeris brevi significantur. Per quos quot lunares aetates in unoquoque decennovenali bis fiunt facile semper cognosces. Nam T in una et Q in altera linia scripta praememoratas aetates, quae fiunt in primo decennovenali cuiusque partis, demonstrabunt. Et rursus e contrario Q ac T secundi cicli aetates ostendent, quia prius aetas, quae quater fit, quamque ter in secundo ciclo invenitur. Item T sola littera tertium ciclum manifestat. Quoniam motas ter aetates non habet. T quoque et Q, sicut primum, ita quartum ciclum significabunt.

Sic haec omnia planissime quisquis intellectualis in rotis binis ac totidem litteris titulatis, quae continuo succedunt, intellegere ac recordari poterit.



Sic aleam, inter solis et lunae cursum creatoris omnium mirabili dispensatione factam, scribendo quantum potui enucleans diligenter narravi.

33. XIII. Quarto decimo loco, hoc est novissimo in ratione, magni cicli non omittere scribere animadverto, quali ordine ab omnibus decennovenalis cicli annis solanus ciclus decies novies incipit. Et quali similiter ordine in universis cicli solaris annis decennovenalis ciclus vigies octies primordium semper accipit; tali ordine solis ciclus in decennovenali ciclo semper incipit. Post primum ciclum solis, qui in uno simul anno, et primus lunae ciclus initium recipit, secundos utriusque sideris ciclos propter concordiam convenientis regulae primos istic ita figurate dicemus. Sic iste solis ciclus, quem primum fecte fieri dixi, in decimo quasi primi cicli lunae anno semper incipit. Secundus ciclus solis in nono decimo secundi anno cicli lunae principium sumit. Tertius solis in anno nono quarti cicli lunae. Quartus in xviii anno quinti cicli lunae exordium habet. 34. Quoniam tertius

secundum istum ordinem ciclus lunae numquam cicli solaris in se possidet initium, sed sic istam regulam inter binos ciclos solanos semper servare valebimus, ut quotus ab unario fuerit annus in ciclo lunari, ex quo primum solaris ciclus initiatur, minus uno sit post denarium in ciclo lunae annus quo alter solis ciclus sequens incipit. Et quot fuit post denarium annus in principio secundi cicli praecedentis binarii, hoc est secundi cicli duorum praecedentium, uno decennovenali praetermisso, eodem semper anno in ciclo lunae ab unario primus binarii sequentis ciclus incipiet. Ita rursus ab anno, cui contigerit fieri post decem minus uno, sicut in primo ciclorum binario monuimus, alter ciclus succedens inchoabit. Sic in aliis ciclis omnibus sequentibus haec eadem regula, primus solis et secundus ciclus in semet custodiri poterunt. Quia sicut non ab alio post unarium anno in principio magni cicli nisi in primo decennovenalis solanus ciclus incipit, sic secundus solaris non ab alio post denarium anno, sed a decimo cicli lunae suscipit exordium. Sic post istos solares duos ciclos, alios binos regulariter semper iunxeris qualicumque anno incipiet post denarium primus eodem suscipit exordium, ab unario inchoabit secundus, ut primus ciclus, in anno nono decimo. Ac secundus in nono et quocumque ordinis anno ex unario posterior ciclus duobus primordium sumpserit minus uno post decem prior duobus subsequentibus ministrabitur. Sed ciclus decennovenalis, qui numquam principium cicli solis in se habet inter duos ciclos unius semper binarii, in hac regula transilitur cum in prima regula inter duos binarios praetermittatur. 35. Si quoque hanc eandem rationem facilius cognoscere desideres, postquam consideraveris quotus annus est decennovenalis, a quo quisquis ciclus solis incipit, si minus aut si plus quam decimus fuerit, adde illis viiii semper et sic absque ullo errore quotus annus erit decennovenalis, ex quo incipiet sequens ciclus solaris, manifeste intelleges. Verbi gratia, illi primo primi decennovenalis anno, a quo prius ciclus solis incipit, auge viiii. Fiunt decem. Sic decimus annus, quo praedictus ciclus secundus incipit, fore dubitare non potest. Cum non plus quam decimus sit annus, quo ciclus incipiebat, addit viiii denario, decem novemque pariter cumulatis, in nono decimo inceptus esse anno tertius ciclus ostenditur. Dum plus quam decimus annus consistat, non solum viiii non augebis, verum etiam x semper subtrahere memento, remanentibus viiii, nonus annus cicli lunae, quo quartus ciclus solis incipit, fieri declaratur. Sed ista posterior regula non tantum per omnem ciclum magnum, sed inter finem illius et principium alterius eiusdem cicli magni nulla contrarietate dissolvitur. Sed indissolubilis circulari ambitu semper sine fine permanet.

36. Vel si aliter hoc idem ius explorare volueris, ut plane istum ordinem sine ulla difficultate scias, novem ciclis, qui sunt in locis paribus, id est secundus quartus sextus et alii ab omnibus annis decennovennalis a decimo retrorsum usque ad secundum incipiunt. Nam totidem sequentes alii, qui in locis imparibus fiunt, hoc est tertius quintus septimus aliique cunctis decennovennalis annis retro a nono decimo usque ad undecimum initium capiunt. Ita palam tripliciter ostenditur quali videlicet ordine ex universis decennovennalis annis ciclus solis semper incipit. 37. Finita nuntiatione de inceptione solis ciclorum in lunae ciclis, quali ordine decennovennales cicli in solaribus ciclis semper incipiunt, profabor. Relicto primo lunae ciclo, cunctos alios in ternariis, id est tres pariter ciclos in una regula, ponam. Quorum primi ternarii primus decennovennalis in vigesimo primi cicli solis anno incipit. Secundus in undecimo. Tertius in secundo. Sic in secundo ternario primus ciclus in vigesimo primo. Secundus in duodecimo. Tertius in tertio cicli solaris anno primordium suscipit. Ita toti cicli eiusdem ordinis uniuscuiusque ternarii, per unarium semper crescentes usque ad finem magni solis et lunae cicli, exordium sumunt.

38. Aut si alias idem ius cognoscere volueris, haec facile recordare; quantum transcendit annum nonum decimum annus, in quo incipit primus ciclus cuiusque praememorati ternarii, tantum denarium transit annus, quo medius eiusdem ciclus initiatur; quantumque transilit annus, quo medius ciclus accipit exordium, tantum discedit ab unario ille, quo tertius coepit; et quotcumque fuerint anni ex unario usque ad annum, quod incipit tertius ciclus lunaris cuiusque ternarii, si addideris xviii illis, totidem annos semper invenies a principio cicli solaris usque ad annum, quo primus ciclus sequentis iam ternarii incipit. Sic a primo ciclo decennovennalis usque ad vigesimum octavum hanc rationem non nescire.

39. Sin per alium modum eandem rationem non nescire concupiscas, sublatis viii de numero annorum, in quorum novissimo primus ciclus cuiusque ternarii incipit, numerum ordinis anni, quo secundus eiusdem ternarii ciclus initium recipit, invenies. Verbi gratia, subtractis novem de xx remanent xi, sic annus undecimus esse ostenditur, quo primi ternarii secundus ciclus incipit. Si ex undecim rursus auferas viiii, remanentes ii secundum annum cicli solis fore principium tertii cicli decennovennalis primi ternarii demonstrant. Ita quando primo et secundo repulsis viiii, remaneant x, si ex decem iterum abstuleris viiii, unus qui superest non solum primi cicli annum sed etiam magni cicli, quo primus decennovennalis incipit,

fieri manifestat. Sic haec ratio in rotali esse gyro sine fine declaratur.

40. Si hanc eandem rationem facillime intellegere volueris, ciclos decennovennales in tres partes divide. Id est, ut prima pars incipiens a primo decennovennali, duos transiliendo semper decennovennales, tertium sumat, et sic illos decem ciclos in decem primis annis cycli solaris secundum naturalis ordinem numeri spectabis incipere. Secunda pars a secundo decennovennali primordium suscipiens, omittens similiter duos, tertius novies omnes annos cycli solaris a vigesimo usque ad vigesimum octavum incipiens tenet. Tertia pars a tertio decennovennali videlicet initians, praetermittens tantundem duos ciclos, tertius novies omnibus cycli solaris annis ab undecimo usque ad nonum decimum annum inchoat. Ita decennovennalis accipiens exordium, totos cycli solaris annos lucide numerat, quod in isto praedicto quadrvio certum fieri probare poteris.

41. In quali ordine numeri solaris annus in anno lunari semper inchoat, hic subsequenter in titulis breviter ostenditur :

i		
x		
xviii		
viii	i	
xvii	xviii	x
viii	xviii	viii
xvii	xvii	viii
vii	xvi	vii
xv	xv	vi
vi	xiiii	v
xv	xiii	iiii
v	xii	iii
xiiii	xi	ii
iiii		
xiii		
iii		
xii		
ii		
xi		

42. In quali ordine numeri lunaris annus in anno solari incipit, hic titulate ostenditur :

i	i		
xx	ii	xx	xi
xi	iii	xxi	xii
ii	iiii	xxii	xiii
xxi	v	xxiii	xiiii
xii	vi	xxiiii	xv
iii	vii	xxv	xvi
xxii	viii	xxvi	xvii
xiii	viiii	xxvii	xviii
iiii	x	xxviii	xviiii
xxiii			
xiiii			
v			
xxiiii			
xv			
vi			
xxv			
xvi			
vii			
xxvi			
xvii			
viii			
xxvii			
xviii			
viiii			
xxviii			
xviiii			
x			

CAP. IIII.

1. Sed nullus mirari debet quod annum solanum in principio decennovenalis anni semper inchoare dixi. Dum solaris annus in vernali aequinoctio hoc in vigesimo primo die mensis Martii naturaliter incipit. Ac decennovenalis annus in quinta decima postea luna pascale primordium iuxta naturam capit. Sicut quamvis longius post duodecimas Kalendas Aprelis indictionum anni ab octavis Kalendis Octobris et anni lunaris circuli a luna mensis Ianuarii ordiri

leguntur, concurrentibus septimanae diebus ac pascha complexis protinus in paschalibus ciclis una semper initiantur. Annus etiam dominicae incarnationis, si in die illius incarnationis inceperit, in vigesimo quinto semper die mensis Martii inchoabit. Sed tamen idem tantumdem praedicta solemnitate finita sentitur incipere. Numerus etenim annorum incarnationis, qui in paschali circulo scribitur, non ad anni futuri primordium, sed ad finem praeteriti pertinet.

2. Cur primus dies anni solis in duodecimis Kalendis Aprilis naturaliter fieri a Graecis et Aegyptiis, caculationis vere peritissimis, affirmatur. Nisi eo quod certum aequinoctium omnia sidera de prima luce specialiter format in illo die quarto fuisse demonstrat.

Quare lunaris annus non in alia aetate, sed in quinta decima luna paschali exordium iuxta naturam capit. Non solum quia luna in nocte primae apparitionis sui supra terram eandem aetatem habuit, sicut perfecte cetera cuncta creator universorum condidit. Sed scilicet, quoniam Mosaicum pascha semper a vespere quartae decimae lunae primi mensis, hoc est ab illius fine, quod est initium quintae decimae lunae secundum nostrum inchoat Imperium. Ita, septem diebus completis, in vespere, id est in fine trigesimi primi diei eiusdem primi mensis terminabatur. Idcirco Aegyptii atque Graeci illius diei, in cuius praecedenti nocte luna primitus supra terra apparuit, epactas per quas totus annus lunaris regulatur scripserant.

3. Ideo Nicenum spiritale concilium non tam sensu constituentis nova, quam sensu adfirmantis vetera, pascha in eo die, hoc est in vigesimo secundo mensis Martii die, si luna dominicusque dies congruenter convenerint, faciendum arbitratum est. Quam ob rem Hebraeis pascha praecipiebatur a vespere inchoare, quia sicut menses et annos illi secundum lunam custodiebant. Ita totas sollemnitates ab initio lunaris aetatis, id est a vespertina hora, eo quod in illa primitus luna super terram apparuit, incipiebant, propter illae religiosae mulieres evangelicae non in nocte post diem sabbati naturaliter habet, sed in nocte post parasceven siluerunt secundum mandatum.

Pro qua causa non per concurrentes alius diei, sed vigesimi quinti tantum diei mensis Martii totius anni dies septimanae regulantur. Non tantum quod ipse dies mensis novissimus primae septimanae creationis mundi fuisse cognoscitur, hoc est primum sabbatum, in quo requievit dominus ab universo opere suo, atque ultimus anni dies dominicae incarnationis. Si spiritalis in die conceptionis inchoaret ille verum etiam, quod in eo mensis die angelus Gabrihel ad Mariam virginem videlicet venisse creditur.

LIBELLUS QUARTUS.

CAP. I.

1. Prosa silet, rursus dictabit cetera metrum.
 Tertius hic finit, quartus liber incipit, atque
 Bissexturn et saltum qui investigando notabit,
 Tardantem lunam solem cita sidera cuncta.
 Iura loqui magni cupiens consumere cicli,
 Nunc de bissexto, de sidere dicere vera,
 Id quantum crescit per singula lumina solis,
 Quid facit, ut semper fiat per quattuor annos
 Plena dies plenis viginti quattuor horis,
 Anno postremo consistens addita quarto,
 Cursus utrum velox an tardus solis in orbe,
 Cum celsa ascendat vel cum descendat in ima.
 Metra tacens iterum monstrabit cetera prosa.

2. De incremento bissexti diligenter animadvertentes nunc scribere necessario incipiunt; quomodo, autem, per singulos totius anni dies bissextus crescit, et quae causa illum fore efficit, utrum celeritas an verius tarditas solis, enuntiare intendimus. Annum primo in quattuor partes aequales partimur, cum totus habeat annus solaris cccclxv dies, unaquaeque quarta pars illius nonaginta ac unum diem sexque horas, id est xc dies ac xxx possidere potest. Dum sex horae de bissexti praeparatione per unum semper annum crescant. Horam atque dimidiam, hoc est lx momenta deputare parti separatim unicuique debemus. Tribus partibus relictis, unam tantum partem, id est xci dies ac vi horae cum lx momentis de bissexti praeparatione retinere studemus. Si ex his duos menses, cum aliis horis quas habent, proiciamus, unus quidem xxx dierum atque decem horae, ac de praeparatione bissexti xx momenta penitus remaneant. Si de mense et horis unaquaeque pars diem ac dimidium et horae dimidiam partem tenebit, cum totidem hoc est xx momenta de bissexti adhuc praeparatione habeamus, unum etiam momentum super unamquamque partem ponemus. Decem et novem partibus expulsis, una pars, id est dies ac dimidius et unius dimidium horae cum bissextili momento remanet, dimidium porro diem tertiamque dimidiae horae partem cum tertia parte bissextilis momenti reicere debemus. Sic unus dies ac duae tertiae partes dimidiae horae habere duas partes tertias unius bissextilis momenti intelliguntur.

3. Post haec ut cognoscamus quantam partem de praeparatione bissexti unus tantum dies habet, quae videlicet lxxii ac partes numerari valebunt ac duas partes dimidiae horae tertias, quas cum die simul prius coniunximus, septuagesimam partem congrue constituemus. Ita nempe duas partes tertias momenti praeparationis bissexti. Inter illos lxxiii partes aequaliter dividere debemus. Sic sine dubio tarditas ascendentis ac descendentis solis efficit ut de vestigiis ascensionis ac descensionis debitae cotidie illius desinit duae partes tertiae momenti, nisi tantum modo lxxiii pars, quam sol omnino consumens in omni die penetrat.

4. Eiusdem quidem bissexti incrementa aliter verissime expediri potest. Ab undecimis Kalendis Ianuarii mensis usque ad xii Kalendas Iulii mensis cum bis xc atque semel unus dies ascendentis habeantur, solis unum diem inter clxxx dies dividere debemus. Dum vi menses in praedicto tempore consistant, unus quisque xxx possidens dies, unum diem de praememorato numero remanentem inter sex menses nobis partiri convenit. Hoc est unicuique mense Iulio horas deputare ut quindecim diebus duae solum modo augeantur. Quae fiunt octuaginta momenta, id est quinque sedecies, e quibus quinque quindecies super quindecim diebus, hoc est quinque simpliciter momenta super singulis ex quindecim diebus componi congruit. Post haec quinque tantum momenta remanserunt, quae super xv diebus praenunciatis, id est unum quodque momentum in tres dies constituere convenienter debemus. Dum per sex menses et unum diem ascensionis solis de bissexti praeparatione tres semper horae crescant, per unum mensem et quattuor horas xx momenta bissextilis rationis facta integre inveniuntur.

5. Sic dividendo mensem secundum priorem narrationem per dies ac dimidios singulos dies, in uno die et quinque momentis atque tertia parte complexa momenti ostentum, id est duas partes tertias unius momenti de bissexti ratione reperies. Ut quantum in uno tantum die integre crescit de bissexti incremento non aestimantes dubitemus, sed certi sine dubio sciamus, diem in centum octuaginta partes etiam dividemus, dum in unaquaque parte quinque momenta et pars unius tertiae momenti, partem, quae cum die pariter ante congregata sunt, centesimam octuagesimam primam partem constituemus.

Ita duas tertias partes bissextilis momenti inter istas omnes partes aequae partiuntur. Sic vere ascendentis tarditas solis praestat, ut de itinere ascensionis debitae cotidie duae partes tertiae momenti supra habitae absque centesima octuagesima prima illarum parte, quam sol finit transcendens, defuerint. Sic ab undecimis Kalendis Iulii usque

ad duodecimas Kalendas Ianuarii mensis contemplari poteris, si xc bis dies menses fieri faciamus, de quattuor diebus remanentibus xc atque sex horas habentibus, unicuique mensi sedecim horas, unicuique diei dimidiam horae partem unumque momentum ac tertiam partem momenti debere coniungere videmus.

6. Post haec unum diem in xlv partes partimur. In quibus unaquaque pars dimidium horae et unum momentum tertiamque momenti partem retinere valebit; atque quadragesimam sextam partem dimidium horae et momentumque ac tertiam momenti partem, quam prius uni diei generaliter consociavimus, una convenienter ponimus. Si descendens sol etiam in unaquaque die duas partes tertias momenti, quas nominari ostentum legimus, subtus habens de itinere unius cuiusque diei debito vis xl quadragesima lx pars diei bissextilis cotidie inde si ineunt per totidem, id est per icccclx dies crescit. Eo quod sol non ascendit ac non descendit, ut praediximus, per diurna nocturnaue spatia tantum quantum debet, idcirco breviori semper temporis intervallo ab ortu usque ad ortum transeurrit, ut de integro die, hoc est de deccclx momentis illud quantum veraciter praememoravimus defuerit.

7. Post haec quisquis ingeniose vixerit, intellegito quod incrementum bissextile cotidianum non tantum plene spatii habet, quantum dixi sed paulisper minus est. Namque millesima quadragesima sextagesima pars illius cotidie desit. Sin enim fuisset integre quantum praedixi, fuisset etiam die ille quadrantilis longior quam universi dies anni, id est deccc et lx plene momentorum. Quod non potest in natura fieri cursum solis, sed aequaliter in longitudine cuncti dies ab occasu usque ad occasum et ab ortu usque ad ortum solarem semper fiunt. Quamvis breviter versificans praedixerim plena dies plenis viginti quattuor horis, quis quoque per inaequalem numerum dierum ignorans dubitat, quod velocior fit ascensio solis in tempore crescentis diei quam descensio illius in tempore crescentis noctis, sicut reuma certe maris citius efficitur, hoc est ad issa ipsius quam recessa.

CAP. II.

1. Bissexturn cecini tardanti sole paratum.

In celeri fieri luna spectabis eundem.

Est itidem etiam in luna simili ratione bissextus, quin nisi in luna bissextus fieret, a die bissexti per octo sequentes annos, qui complevisent finiendo semper si saltus non esset lunarem ciclum, concordia lunae, quae habetur cum diebus mensium, turbaretur.

Non solum post xxviii dies ac xii horas, in quibus lunaris mensis consummari dicitur, velocitas lunae solem antecedentis praestare videlicet potest, ut bissexti aetas post praememoratum spatium crescat. Verum etiam supplendam aetatem septem embolismorum praeparare valet. 2. Nam, si tardius lunaris cursus fuisset quam sit, prius nempe luna, sole intra illam et coelum recte interveniente suum cursum menstruaem consumpsisset, cum lunaris mensis a studiosis huius rationis, complexis xxviii diebus ac dimidio die xxxiii momenta dimidiumque momenti et quintam momenti partem, atque quintae partis dimidii momenti quadragesimam partem habere aestimetur. In ducentis xxxv luminis, quae decennovennalem implent, omnino ciclum congregantes una illa cum labimus lunas, cogente necessitate, pluraliter, appello. Ab unaquaque luna xxx momenta accipiam, lx a duabus, a quattuor horas iii, ab viii horas xxx, ex octaginta horas lx, ex cxx horas xc, ex cc horas cl, ex ccxxxv lunis horas clxxvi et momenta x, hoc est vii dies et horas viii decemque momenta. Ex unaquaque rursum luna tria momenta suscipiam, vi a duabus, xxx ex decem, lx ex xx, tres horas ex xl, xv ex cc, x ac vii horas atque xxv momenta ex ccxxxv lunis. Ex unaquaque luna iterum dimidium momenti ex cctis c momenta, ex ccxxxv lunis duas horas atque momenta xxxvii dimidiumque momenti. Ex unaquaque itidem luna quintam partem momenti, id est ex v momentum unum, ex xx lunis iiii momenta, ex c lunis xx momenta, ex cctis lunis unam horam, ex ccxxxv hora una atque septem momenta. Ex unaquaque item luna quadragesimam septimam partem quintae partis dimidii momenti. 3. Quod facilius intellegi quibit si totas lunas praenuntiatas in v partes dividerimus. Ut unaquaque pars xlvii lunas habeat, ut ex unaquaque parte quintam dimidii momenti partem recipiamus.

Recapitulantes quoque haec universa praedicta colligere volumus; hoc est vii dies et viii horas xque momenta, similiter x ac vii horas atque xxv momenta. Sic duas horas atque momenta xxxvii dimidiumque momenti; ita horam unam atque vii momenta. Eodem iure quadragesimam septimam quintae partis dimidii momenti colligere volumus. Sic ista cuncta praedicta diebus quattuor ac tribus quadrantibus bissextilis praeparationis, atque embolismorum tribus diebus ac xii horis nec minus nec amplius sed aequaliter convenire putantur.

Haec de bissexto cecini, saltum memorabo,
Qui tarda luna effectus generatur in annis.

CAP. III.

1. De lunaris quidem saltus praeparatione, quantum breviter possimus, dicere curamus. Primum, quod si post xxviii dies ac xii horas tot momenta, quot praefati sumus, integre fuissent, numquam saltus esse valeret. Sed, eo quod desunt aliqua de illis quae diximus, quae nunc nuntiantes saltum quanta sint dicemus, idcirco sit saltus. Quod momenta brevitae mensis lunae tardantis desunt de illis, quae post xxviii dies atque xii horas in lunari mense fieri nuntiavimus in sequentibus dicemus. 2. Quattuor momenta ex unaquaque luna abstrahamus, viii ex duabus, horam ex x, v horas ex l lunis, x e centum, xx ex cc, xxiii horas ac dimidiam horam ex cctis xxxv lunis. Unam dimidiam horam de plenitudine diei desse videntes, duodecimam momenti partem, hoc est unum integre momentum ex xii lunis expellamus, quinque momenta ex lunis lx, decem momenta ex cxx, quindecim momenta ex centum, lxxx, x et viii momenta ex cctis xx et viii. Ex unaquaque luna de vii remanentibus duodecimam aequaliter momenti partem. Ex unaquaque luna de cxxxxv lunis quadragesimam septimam partem duodecimae partis momenti, hoc est ex quadraginta septem lunis duodecimam momenti partem.

3. Sic ex aetatibus lunae deputatis ante bissextilibus diebus una lunaris aetas plene deesse manifeste cernitur. Quae sola causa quidem lunarem fieri saltum praeparat, de quo facile fingentes exemplum monstrabimus. Post xx primum diem mensis Martii, xxviii lunam habentem bissexti diem fieri fingemus. Cum praedicto die bissexti quasi xxviii luna fore videatur, sequenti continuo diei eadem aetas lunae, si saltus in ipso non esset anno, verius deputaretur. Sed, eo quod saltus sit non praedicta aetas lunae, sed xxx esse veraciter brevitae lunaris cursus menstrui citius ascensione praeveniente in illo die erit.

CAP. IIII.

1. Defectum saltum lunari lumine dixi.

Bissextus lunae dicam quo iure creatur,

Inventis nuper veris, errore repulso.

Nunc iterum diligentius et veratius de lunari bissexto ac embolismis considerabimus. Postquam momenta, quae ad saltum pertinent de momentis quae bissexto atque embolismo deputari diximus, primitus expullimus. Omnia quot remanserunt omnino monstrabimus. Hoc est ex unaquaque luna accipere debemus xxviii momenta dimidiumque momenti ac decimam partem momenti et sexagesimam partem

momenti atque quadragesimam septimam partem sexagesimae partis momenti, quae nunc sic investigare penitus incipimus. Ex unaquaque luna xx momenta habere primo valebimus; ex duabus horam; ex xx horas x; ex l lunis horas xxv; ex c horas l; ex cc horas c; ex ccxxxv lunis dies iiii horas xx et unam dimidiamque horam.

2. Sic iterum ex unaquaque luna viiii momenta; ex x lunis xc momenta, id est duas horas x que momenta; ex xx lunis iiii horas ac dimidiam; ex xl lunis viiii horas; ex cc tis lunis xlv horas; ex ccxxxv lunis dies duos horas iiii momenta xxxv. Ita rursus ex unaquaque luna dimidium momenti; ex cctis lunis l momenta, hoc est horas ii dimidiamque; ex ccxxxv lunis duas horas momenta xxx septemque cum dimidio momenti. Tantumdem ex unaquaque luna momenti decimam partem, id est ex x lunis unum momentum; ex l lunis momenta v, ex cctis lunis momenta xx; ex ccxxxv lunis momenta xxiii dimidiumque momenti. Similiter ab unaquaque luna sexagesimam partem momenti, hoc est ab lx lunis unum momentum, ex clxxx lunis tria momenta, ex ccxxxv lunis momenta iiii. Nisi defuisset sexagesima pars momenti, quinquies propterea ex unaquaque luna xlviimam partem sexagesimae partis momenti sumere debemus.

3. Quod facilius intellegi poterit si praedictas universas lunas, ut prius fecimus, in v partes dividamus, ut unaquaeque pars xlvii lunaris habet, ut ex unaquaque parte lxxm partem momenti suscipiamus, ut quattuor momenta praedicta plena fiant. Sic ad praeparationem bissexti et embolismi plusquam nongentesima sexagesima prima pars lunaris mensis aut unius cuiusque aetatis lunae constituitur. Nam quot sunt dies vere in lunari mense, id est xxviii atque dimidius dies, totidem momenta post illos dies superflua esse diximus.

Quia dum in una semper aetate lunae verbi causa ab occasu usque ad occasum, et ab ortu usque ad ortum solis dcccclx non plene momenta ob solarem bissextum fiant. Nongentesimam sexagesimam primam partem momentum bissextile unicuique diei, ac dimidium momenti dimidio diei coniungimus. Post haec duodecima ac sexagesima pars momenti, atque quadragesima septima pars sexagesimae partis momenti superflue remanet. Quae omnia in triginta partes partiri quibimus, ut unaquaeque pars cum bissextili momento unicuique diei atque uni dimidioque diei consocietur. Sed trigesima pars, quae diei dimidio deputatur minus quam dimidiam partem suam relinquere debet, ut inter xxvii dies dividatur.

4. Praescriptos numeros hic infra congregatim scribere volumus, ut facilius praedicta intellegantur.

Inter cccxxv lunas xx momenta ab unaquaque luna faciunt dies, vii, horas viii, momenta x. Momenta viiii faciunt horas xvii, momenta xxv. Dimidium momenti facit horas ii, momenta xxxvii ac dimidium. Quintum momenti facit horam i, momenta vii. Quadragesima septima pars quintae partis dimidii momenti facit dimidium momentum. Omnino dies viii et horae sex fiunt.

Inter cccxxv lunas quattuor momenta abstracta ab unaquaque luna faciunt horas xxiii ac dimidiam duodecimam momenti, et xlvii pars momenti dimidiam horam faciunt. Dies una fit.

Inter cccxxv lunas xx momenta ab unaquaque luna faciunt dies iiiii, horas xxi ac dimidiam. Novem momenta faciunt dies ii, horas iiiii, momenta xxxv. Dimidium momenti facit horas ii, momenta xxxvii ac dimidium momenti. Decima pars momenti facit xxiii momenta ac dimidium momenti. Lxma pars momenti et xlviima pars sexagesimae partis momenti iiiii momenta faciunt. Omnino dies vii et horae vi fiunt.

5. Ex his quae praedixi, O bone rex, cognoscere valebis quod si sol tempore ascensionis suae cotidie quantum debuit ascenderet, ortum occasumque suum ad septemtrionalem plagam magis quam sit extendisset. Atque in tempore descensionis suae ortum et occasum maius quam sit ad austrum propinquare fecisset.

Vel si facile cognovissemus quando sol decetos lx semper momenta complet, et quando luna menstrualem cursum suum omnino vere finit. Nec saltus nec bissextus fuisset. Nec lunaris aetas dimidia embolismi lunae augetur. Sic mirabili dispensatione divina factam ciclorum concordiam utrorumque siderum plene bene intellegens sapere poteris.

CAP. V.

1. Tardior en quantum remanet retro, sole citato,
Luna hodierna loquar hesterna sorte locorum.

Post quot momenta in spacio xxiiii horarum luna tardior sole cotidie remanet. A prima lunari aetate usque ad novissimam post triginta duoque momenta dimidiumque momenti, ac paulo minus quam vigesimam nonam illius partem, hoc est paulo plus quam trigesimam septuagesimae tertiae partis ostenti partem completo die tardior semper lunare reperitur. Ostentum est, ut de quadrantili iure disputans praedixi, remanentes duae partes momenti postquam tertia illius segregata expellitur.

Omnia praescripta per omnes lunaris mensis dies hic pariter congregabimus, xxx momenta in uno die, lx in duobus, centum

xx, hoc est tres horae, in quattuor diebus, vi horae in octo, xii horae in xvi, xxi horae in xxviii, xvii horae et v momenta in xxviii diebus, ac xii sequentibus horis cumulate efficiuntur. Duo momenta rursus in unoquoque die, iiii in duobus, una hora in xx diebus, x et viii momenta in novem diebus, ac succedentibus horis xii, quae coniuncta cum praescriptis momentis faciunt xxiii horas atque xxiiii momenta. Ac iterum dimidium momenti in unoquoque die post praescriptos numeros accipitur. Quae simul congregata xiiii momenta dimidiumque momenti et quartam partem momenti complent. Quae pariter cum praedictis numeris horae xxiii et momenta xxxviii ac dimidia quartaque pars momenti videlicet fiunt.

2. In singulis iterum diebus universis praedictis inter solem lunamque fieri solet, ut intersit paulo plus quam trigesima pars ternae partis momenti, et paulo plus quam trigesima pars quartae partis momenti, ac paulo plus quam xxxma pars septuagesimae tertiae partis unius ostenti. Quoniam septuaginta duae partes aliae ipsius ostenti ad bissexilem quadrantem pertinent. Quid est, quod dixi paulo plus quam trigesima pars, nisi eo quod dixi duodecim horae novissimi diei mensis lunaris habeant paulisper amplius quam dimidiam partem trigesimae partis praedictae. Atque inter xviii dies praecedentes altera pars totius numeri, cuius fiunt numeri, partes ipsa tertia et quarta quas dixi.

3. Idcirco non aliter est tertia et quarta pars quam dimidia ac duodecima semper, ut in omnibus horis diei quisquis illud, exempli causa probare voluerit, facile reperiet. Sic in cunctis aliis numeris, qui tertiam et quartam duodecimamque partem habent, certissime inveniet. Ideo dixi tarda cotidie lunam a principio lunaris mensis usque ad plenilunium elongari a celeri sole. Atque a plenilunio usque ad lunaris mensis paene finem aequae rursus soli veloci propinquare per xxxii momenta dimidiumque momenti ac paulo plus quam trigesimam partem dimidii momenti atque duodecimae partis momenti et septuagesimae tertiae partis ostenti. Propterea haec in xxviii diebus ac xii horis vigies octies dimidiaque semel tantum parte tardans luna circumlustrat orbem terrarum. 4. Quamvis de concordia immutabiliter stabili maris et lunae convenienter in hoc loco narrari debuit, tamen quoniam sum procul separatus a mari, ingeniosis habitantibus iuxta mare eam nuntiare relinquo.

CAP. VI.

1. En quantum est citior quam sol conversio caeli,
Ut dicunt veteres cum fixis omnibus astris.

Completo die uno et sexagesima secunda parte alterius diei sequentis, id est xiii momentis ac tertia plene parte momenti, sol semper tardior sideribus in firmamento positus, illo velocioribus, post duo momenta postque unum plene ostentum cotidie remanet. Terminatis diebus tribus et una hora alius diei, post octo momenta remanere videtur. Finitis diebus xv atque v horis, post horam fieri reperitur. Consumpto mense, hoc est xxx diebus ast x horis, post duas horas fieri invenitur. Consummatis duobus mensibus et xx horis, post quattuor horas esse conspicitur. Completis lxxxiii diebus, post quattuor horas et post xxxii momenta tardior semper sol stellis praedictis adesse deprehenditur.

2. Sic in aliis lxxiii diebus, quater usque ad finem anni, per eadem spacia cotidiana, tardior sol celestibus astris remanet. Haec iam causa praestat, ut sol in toto videlicet anno, hoc est in cccxv diebus et bissextili quadrante, xii omnino semper signa peragret. Ita quidem omnes stellae in firmamento constitutae in solari penitus anno cccxvies circumeunt orbem terrae, praeter illas, quae circum eum eunt, duas chias stellas, id est duos caeli cardines, hoc est septentrionalem, quem videmus, et, ut philosophi testantur, subterraneum australem, quem numquam cernere possumus. Quae stellae totiens caeli cardines circumeunt, quotiens aliae universae praedictae circumlustrant orbem terrarum. 3. Sed illum cursum rotalem stellarum, uti primum disticon titulans hanc quaestionem declarat, circum firmamento cotidie simul fieri philosophi adfirmant. Licet alii dicunt stabile fieri firmamentum ac sidera currere tantum. Iam si velocitas solis in aethere vel in firmamento semper immobiliter stante, ceu scriptum est, volantem in annuo spatio, ut ille peragret xii sidera, efficeret non ex prioris signo in posterius retrorsum intrasset. Verbi gratia, ex Ariete in Taurum, ex Tauro in Geminos, et cetera; sed ex subsequente in praecedens signum intravisset, ut ex Ariete in Pisces, at ex Piscibus in Aquarium, ac reliqua. Sed si sol atque luna et stellae, quae planetae nominantur, in firmamento sine ulla cessatione cessante positi sunt, ut multi existimant, non tarditas eorum quidem facit, ut ex anterioribus signis in succedentia transmigrant. Sed eo quod contra impetum totius caeli propriis semper cursibus feruntur.

Et, si sic est, nihil aliud mihi videtur efficere, ut cotidie tardior luna remaneat sole, nisi eo quod luna fortius quam sol adversum in cessabile firmamentum vehitur.

CAP. VII.

1. Prosa vacans istic, tum metrica verba sequuntur,
 In quanto spatio sol intrat siderea arva.
 Quantum luna intrat viginti et quattuor horis,
 Quantum hodie signum praecessit in ordine lunam,
 Tantum ante te solem in septem sex atque diebus
 Viginti et sex momentis iam parteque nona
 Momenti unius paulisper eo amplius atque
 Praecedet solem signum, in quo longius adhuc
 In spatio dicto lunam interque illud habendo
 In fine unius consumpto rite diei.
 En quod praedixi numeratis plus remanere
 Momenti id sextae partis septem ordine nonae.
 Hos binos numeros inter partimur in aequa,
 Viginti ac septem cum octo horis lumina solis
 Luna in quis signa integre duodena peragrat,
 Tarda retro remanens, fugiant cum sidera fixa.
 Metra silent, ac idem demum ius prosa loquetur.

2. Cum luna perlustret unumquodque signum per duos dies et per vi horas ac per bis se unius horae. Et xii omnino signa in viginti septem diebus et octo horis semel transcurrat. Ac decies atque ter in trecentis quinquaginta quinque diebus octoque horis eadem xii signa peragrat. Remanent xvi horae viiique dies usque ad finem solaris anni, in quibus quarta decima vice transit linia quattuor sidera atque paulisper minus quam quartam partem quinti signi. Hoc est xiii horas ac tertiam partem quartae decimae horae illius. 3. Quoniam luna in unoquoque signo habeat liiii horas et bis se, id est duas partes tertias unius horae, ut cognoscamus in quot diebus et momentis ac partibus momentorum sol in signum retro tantum spatii transit, quantum luna in xxiiii horarum die tardans retrorsum intrat, post etiam xiii discursus lunae in zodiaco circulo finitos xvi horas et viiii praedictos dies, qui restant usque ad finem solaris anni, in xiii partes aequales dividere animadverto, dum praememorati dies cum xvi horis ccxxxii horas habeant. Sic ccxx unamque horam in xiii partes aequae dividam. Unaquaeque pars x, vii que horas habebit.

Sin de undecim remanentibus horis punctos fecero, xliii erunt,

Ex quibus si xxxviii in xiii partes dividero, unaquaeque pars iii punctos possidebit. In quinque punctis restantibus momenta I fiunt. A quibus xxxviii momenta faciunt xiii partes, unaquaeque pars tria momenta retinens. Undecim momenta remanentia complent xvi ostenta atque dimidiam partem ostenti. Ex illis xiii ostenta aequaliter in totidem partes dividenda, remanent tria ostenta ac dimidia pars ostenti, hoc est duo momenta tertiaque pars momenti. Quae si partita fuerunt in xiiii partes, unaquaeque pars sextam momenti partem palam videtur habere. Si istae tum xiii partes dividantur singulae omnino sextam partem momenti atque tertiam partem decimam partem sextae partis momenti, hoc est septuagesimam octavam partem momenti habebunt. Ita quidem tarda luna semel transiens per signiferum circulum et rursus minus quam tertiam partem primi signi in tertia decima parte praedictarum xvi horarum atque viii dierum, hoc est in xviique horis ac tribus punctis totidemque momentis et uno ostento. At sexta momenti parte ast septuagesima octava, ceu praedictum est, parte momenti sol tardans tertiam decimam partem signorum horoscopi peragrat.

4. Post haec, ut cognoscatur in quanta parte quarti decimi diei post iam xiii dies completos intrat sol in signum tantum spatii, quantum introit luna in die xxiii horarum. Horas et punctos ac momenta partesque momentorum praedictas inter xxvii dies et viii horas, in quibus luna penitus zodiacum pertransit, partiri volo. Si decim septemque praememoratae horae in dimidias partes dividantur, xxxiiii erunt habentes singulae xx momenta. Ex quibus, si xxvii diebus totidem partes iungantur, remanebunt vii partes, quae exi momenta habent. A quibus cxx momenta inter xx dies dividi debent, id est vi momenta pertinentia ad unumquemque diem, remanserunt xx momenta. Quibus si iii puncti augeantur, simul I momenta fiunt. E quibus xlii momenta dividenda inter vii dies, unusquisque dies possidebit vi momenta; remanent viii momenta et unum ostentum. Coniungi viii horis post xxvii dies remanentibus debent. Remanent tria momenta, quae si dividantur intra xxvii dies, unusquisque dies nonam partem momenti habebit. Remansit sexta pars momenti. Illa quidem si partiatur in partes novem, duae partes ipsarum nonam partem tertiae partis momenti complebunt. Quae viii horis post xxvii dies remanentibus iungi videlicet debent. Remanent novissime vii partes nonae sextae partis momenti. Hoc est, postquam sexta momenti pars in novem partes dividitur, septem ex illis remanent ac tertia decima pars sextae partis momenti, id est septuagesima octava pars, ut praedixi, momenti. Quas inter xxvii dies et viii horas partiri debemus.

Ita, dum tardans quantum luna transit in hereditatem sidream in xxiiii horis, ostenditur sol aequaliter idem spatium peragrare in xiii diebus et xxvi momentis nonaque parte momenti atque paulisper minus quam vigesima septima parte praescriptarum partium minimarum.

5. Sic dum philosophi narrant stellas in firmamento positas maiorem circuitum solis circuitu habere, tamen illa sidera sole velociora semper esse certe videntur.

Quoniam, si aequaliter cucurrissent, in uno eodemque signo semper sol fuisset; ita sol perspicue celerior quam luna fieri cernitur. Cum idem philosophi lunam breviorum sui cursus circulum pertransire confirmant, sin alicui istius obscurae quaestionis haec difficilis displicuerit solutio, nuntiatio ille facilius et ego hac neglecta, narrationem ipsius voluntarie sequar. Idecirco hanc quaestionem novissimam eius libri primo breviter per metrum, et iterum eandem per prosam narraui, ut videatur, veluti in prima parte tertii voluminis huius codicis dixi, quantum difficiliores essent isti codiculi, si per metrum scripti fuissent, quam si per prosam. Quod in primo circulo istorum quattuor libellorum, ubi duo argumenta de numero crescenti invento de numeroque per semet multiplicato scripta sunt, videri manifeste potest, quia prius illa per prosam, deinde per metrum nuntiavi.

6. Prosa tacet, claudens dicet restantia metrum.
 Quisquis in his videas incertum corrige recte,
 Impediit me etenim forsans doctrina scolarum.
 Mens ad multa minor divisa ad singula, namque
 Praesertim humanas raro dum vidimus artes
 Profecte fieri iam posse per omnia plene.
 Haec dum quisque scribat debet discernere caute
 Ne pereat metrum confuso fame prosae,
 Aut non discretas sese inter versibus ipsis,
 Fine ac principio commixtis versiculorum,
 Linia si partim simul una tenebit utrumque.
 Quattuor ex notis versum quater amplificabo,
 Versiculos alios ternos ita namque notabis.
 Tempora ferventis velocis cernite solis
 Tempora velocis ferventis cernite solis
 Cernite ferventis velocis tempora solis
 Cernite velocis ferventis tempora solis.
 Nec plus versiculus valet unus multiplicari.
 Post octingentos annos iam postque bis octo,
 Conceptu domini praesens nunc annus habetur,

Perfecte ex aliis, quae sunt scripta ante relinquens,
 Dixi, ut sol calidus currunt et frigida luna
 Per parvos cielos ac magnos tramite certo,
 Bissexturn lunae et solis, saltum ordine lunae,
 Tardantem lunam solem, cita sidera cuncta,
 Aethereas memorans stellas iam quinque vagantes.
 Semper licet caelent se quas quoque semper videmus.
 Pastores ovium et caprum tardique subulci,
 Custodesque boum nec non servator equorum,
 Rite domum referunt omnes armenta gregesque.
 Proprietas sequitur, dicunt ut grammatici ipsam.
 Non proprie scriptis de multis pauca profabor,
 Ut reprehensores studeant discernere caute,
 Nam magis id cupiunt multi, quam vera probare,
 Grammatici, quamvis in multis propria dicunt,
 Auctores eadem saepe haud servare videntur.
 Praesertim vates artant quos metrica iura,
 Ut prior atque alter de multis noscitur esse,
 De binis alius primusque existere contra,
 Luces et paces pluraliter esse videmus.
 Si alia eiusdem paria rationis habentur,
 De binis alius de multis alter habetur,
 De binis primus de multis et prior extat.
 Si sic discutias artes, aliquando videbis
 Propter missis multis fero pauca relatum,
 Nam paria eiusdem iuris si dixero cuncta,
 Ante diem clauso componet vesper Olympo.

BREVIS ADNOTATIO CRITICA.

1. De saltu lunari] In margine additur: bissexto.
2. mensis] men convenient sis cod.
3. xii] Correctio supra scripta: vii.
4. quippe] Correctio supra scripta: num.
5. prioribus] Correctio supra scripta: precedentibus.
6. Post quatuor—posterioribus versibus] Haec verba in codicis margine superiore scripta sunt.
7. Alti] In margine superiore haec verba adduntur: aera non tangit haec sed tantum aetherissima.
8. Pythagoras—sidera fixa] Hi versus in codicis margine inferiore scripti sunt.
9. illum. . . .] Locus mutilus; forte excidit, diem.
10. subtrahere. . . .] Locus corruptus: meñtio cod.; forte pro nuntio.

INDEX NOMINUM PROPRIORUM.

Alcuinus (Albinus) Praef.; Note.	Houzeau Praef.
Augustus II, cap. xiii, 3, 4, 7.	Lancaster Praef.
Caesar I, cap. viii, 5.	Letronne Praef.
Cantor Praef.	Louis Note.
Carolus I, vi, 5; I, i, 1.	Maga Praef.
Christus I, cap. iii, 2.	Mangeart Praef.
Columbanus Praef.	Maria III, cap. iiiii, 3.
David II, cap. xiii, 7.	Marianus Scottus Praef.
Dicuilus Praef.; I, cap. vi, 5;	Mommsen Praef.
I, cap. viii, 5.	Origenes Praef.
Donatus Praef.; I, cap. viii, 5.	Pythagoras Praef.; II, cap. i, 1, 4.
Dümmler Praef.; Note.	Sanderus Praef.
Dungalus Praef.	Sickel Praef.
Ebert Praef.	Sybilla Praef.
Gabrihel III, cap. iiiii, 3.	Victorius Note.
Helias I, cap. vi, 4.	Virgilius Salisburgensis Praef.
Hloduicus I, cap. vi, 5; cap.	Ysidorus Praef.
viii, 5; II, cap. xiii, 7.	

PLURIMOS QUESITIVOS HUIUSMODI.

LOCUTUS.

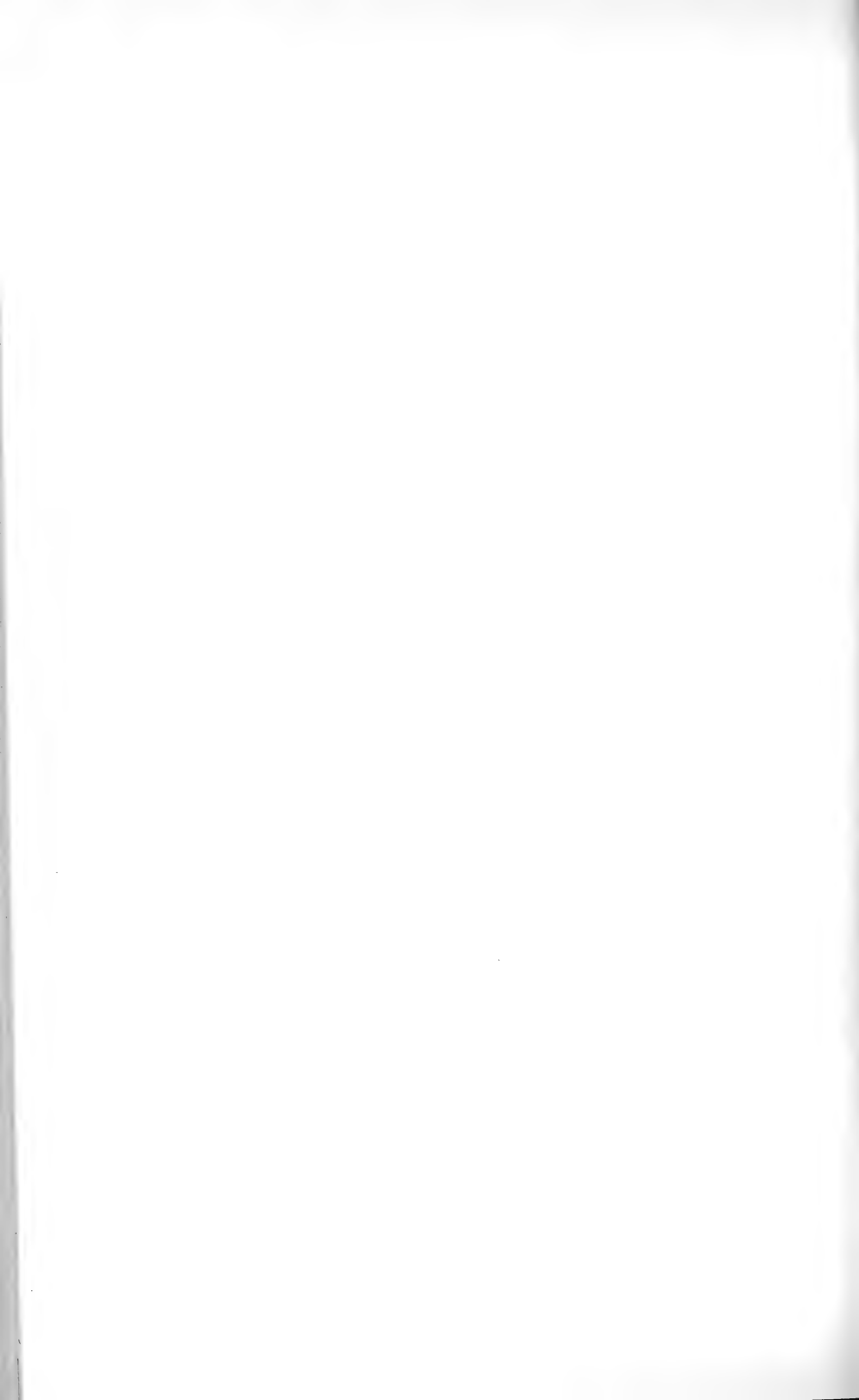
DE QUOTUS MENSIS ISTA APRILIS
HUIUSMODI PARS PRIMUM PERVADEAT.

SI QUOTUS MENSIS ISTA APRILIS

Argumentando intellegere uolueris a
kalendis eiusdem ap[ri]lis lunari situ cop[er]to
denas epactas lunae habentib[us] principiu[m] cidi
huius rationis semp[er] incipe. Ac epactas uigesimi quinti di
et perdenas mensis martii. sed ita e contrario r[ati]o r[ati]o
uolueris ut si ut primae nouissimae & nouissimae
primae que sic infra hoc ordine scribunt[ur] praeuide.

X. XXVIII. XXVII. VII. XXVI. XXV. III. XXIII.

um nunc in septimo decimo finis incipiente
et in uno epactas septimu[m] decimu[m] locu[m] possiden
et in ordine retrogrado que & iam exi sunt
naturales ordinaliter epactas quot fuerint in kt
et in uniuscuique mensis ut puta nunc in mente di
et in conspiciente pariter congrega. Que
et in sunt. De his xxx. expulsis unus remanet
et in mensis huius rationis hoc e[st] aprilis e[ss]e uideatur.



XVI.

THE CISTS, DOLMENS, AND PILLARS OF THE WESTERN
HALF OF THE COUNTY OF CLARE.

BY THOMAS JOHNSON WESTROPP, M.A.

PLATES XXIII.-XXV.

Read JUNE 10. Ordered for Publication JUNE 12. Published JULY 31, 1907.

THE dolmens of Eastern Clare having been treated with considerable detail in the Proceedings of this Academy, we are led to bring forward briefer notes on the more numerous monuments of the western half of the county, in order to complete as far as possible the list of its early remains before the close of the older series of our publications. Though we do this somewhat earlier than we intended, it is in the belief that longer and more systematic work in the past may have put the field-work of this more difficult district on at least a par with the notes on the eastern monuments. We also believe that, though individual examples of various forms of dolmen may yet be discovered, the survey is too far advanced for these to affect the broad facts of distribution and type. Beyond these questions we hardly venture to advance at present.

There are, it may be remembered, three preceding papers,¹ which may be taken with the present one as covering the known dolmens, cists, and pillars of Clare. The first, in 1897, aimed at giving a fuller list than was then in print. It gave, besides the list, detailed accounts of the monuments of Ballyganner Hill, Addroon, Corbehagh, Tyredagh, and Caherloghan. The other two papers cover Eastern Clare, being devoted to the baronies respectively of Upper and Lower Bunratty and Upper and Lower Tulla. There is also a detached account of the remains at Ballycroon.²

¹ Proc., Ser. iii., vol. iv., p. 542, xxiv. (C), pp. 85, 107.

² *Ibid.*, Ser. iii., vol. vi., p. 85.

PREVIOUS SURVEYS.

The surveys earlier than 1897 were extremely defective. In 1808 Hely Dutton noted, briefly enough, but with some curious notes, eight dolmens—Deerpark; Cotteen, or Commons; Tully-naglashin, or Slievenaglasha; Ballykisshen, or Ballycasheen; Mount Callan; and three at Ballyganner.¹

The Ordnance Survey Letters of 1839 mention (and usually only mention) the monuments of Cooleamore, Cragballyconal, Ballyganner (two), Deerpark, Slievenaglasha, Reabachan, and Cotteen in Burren and Inchiquin; Kiltumper, in Ibrickan; and, in the eastern half, Cappaghbaun, Drummin, Ballykelly, and two at Miltown, with what the authors consider the "well" of Tobergrania. The maps of that period give 34 in the west, 42 in the east—some 76. Miss Stokes next published lists, one² "drawn up by the ladies of the Alexandra College Archæological Class, who have commenced by using the Ordnance Survey Letters," in 1874. This only gave 14 dolmens (11 named). The second³ is less accurate, and gives only 13 names; and neither of these lists gives a single monument to the east of the Fergus. We published a tentative list of 83 dolmens in 1884,⁴ and another, with 116 names, in these pages in 1897 (as noted); while it was in the press, there appeared the great work of William Copeland Borlase, on "The Dolmens of Ireland," giving 96 of the Clare dolmens.⁵ The present paper raises the number to over 170 for all Clare. It is too probably incomplete, like its predecessors; many cists may lie concealed in the crags and the hazels of Burren and Inchiquin, or the deep heather and furze of the eastern hills, or may be buried in cairns or built into fences. The deadliest delusion that can seize an Irish antiquary is that his work is complete, even after many years of unsparing labour. Let us leave that fallacious, pleasing belief to those who have touched the edge of Irish Archæology, and believe that they have secured "the spoils of the conquered ocean" thereof. The joy of beginning and furthering the work is ours; let us not grudge the joy of harvesting to those who come after—"Quo non possum corpore, corde sequor."

¹ Statistical Survey of Co. Clare, p. 317.

² "Early Christian Architecture of Ireland," p. 146.

³ "Revue Archéologique," vol. xlv., 1882, pp. 19-21.

⁴ R. S. A. I. Journal, vol. xxiv., p. 287.

⁵ Loc. cit., pp. 65-102.

EARLY DIVISIONS.

As we intend to deal mainly with the monuments, we only touch briefly on the earliest tribal arrangements, none of which may be old enough to overlap even the latest dolmens. In the first century Ptolemy places the Ganganoi, the Irish Siol Gengain (the Gan, Genann, and Sengan tribes) at the mouth of the Shannon. According to the Dindshenchas, Sliab Collain, or Mount Callan, was in Sengann's heritage.¹ The Corcomroes (including Burren) and the land in the south-west angle of Clare were held by the Corcamodruad and Corca-bhaiscoinn tribes, with "non-Milesian" names;² but the chiefs of the first claimed descent from Fergus and Queen Maeve. The Martini Firbolgs were settled about Kilrush. Some shadow of a settlement of the still earlier Ua Cathba and Ua Corra tribes in Western Clare falls on the earliest historic tales of Thomond. History, however, can claim but little behind the first fierce spring of the Dalgcais tribes from their centre in Eastern County Limerick across the Shannon. The Munster Kings Lugad Meann and Connall Eachluath had reduced central Clare up to Lughid Hill, its present central bound towards Galway, by A.D. 380; but even in the dawning of Christianity, in the middle of the following century, the hilly districts of Aughty and Elva were still unsubdued; and the race of Cashel rested content with cattle-tribute from Corcomroe and Corcovaskin. The legend of the "Glas" cow has an echo of the contests along the fords of the Fergus;³ the "Book of Rights" claims forts along that border at what are most probably Ballykinvarga, Inchiquin Hill, Tullycommoun, and perhaps Torlough Hill, and (a lasting trace of the terrible final battle) forbade the King of Connaught to go to "Luchid" heath in a speckled cloak. The only later disturbances of the tribes were the intrusion of the Dalcassian MacMahons into Corcovaskin, and the settlement of the Ui Breacain (after their expulsion from their Leinster home by Walter de Ridelesford, about 1180) on the coast, "between the two *invers*" (the creeks of Dough and Dunbeg), to which they gave their name Ibrickan.

¹ "Revue Celtique," 1894, pp. 317, 318.

² See the interesting articles by Mr. J. MacNeill in "The New Ireland Review," 1906.

³ R. S. A. I., vol. xxv., p. 227.

DISTRIBUTION.

As formerly noted, the majority of the Clare dolmens run in a broad band from the Burren, south-eastward to Slieve Bernagh; few are found on either side of the line. Unlike those of Spain and Portugal, the monuments lie rather inland than on the coast. They most abound where the plank-like slabs of the Burren and the gritstone blocks of Eastern Clare lay ready for their construction. It is true that suitable slabs also lie loose on the cliffs in Moyarta, where only one dolmen is known to exist; but the monuments mainly observe geological conditions. From Kilkee to Calluragh, Carncreagh, and Kiltumper, for over 30 miles, none remain. More strange is the scarcity between Corofin and Crusheen; those of Tradree were possibly "improved off the land" by agriculture; but probable traces of one have been noted below.

TYPES.

The predominant form is that of a stone box, usually tapering and sloping eastward, and made of four or more slabs and a cover. Ballycashen, however, widens, and Poul nabrone slopes westward. The southern dolmen of Baur has an inner cist at the east end.

The typical "box" occurs in a circle of slabs set on edge, as at Parknabinnia (iv.) and Rylane, in a tapering or irregular fence of slabs, as at Iskancullin, and the levelled giant's grave at Miltown, or in a kerbing of low blocks, as at the pillared dolmen of Ballyganner and several others. It is also found within dry-stone ring-walls, as at Creevagh, where it occupies the place of honour in the garth, a rock-cut avenue leading into the fort to it; or built into the wall with a "creep" passage opening into it, evidently merely adapted to some use in the later fort. A rock-cut avenue also runs from the fort of Caheraneden to a fallen cist in Ballyganner North.

The very small "boxes" occur in cairns, as at Berneens, Poulaphuca, and Leanna, recalling that in which the Leabhar na hUidhre says King Fothach Airgtheach was buried about A.D. 285. They are rarely over 6 feet long, and some so short as to be mere "bone-boxes." Double-walled cists occur, as at Berneens, Tullycommoun, Derrymore, and Cappaghbaun.

The true "long grave" is badly represented in Clare (as at Ballyogan,¹ Killokennedy, Ballykelly, Formoyle, and perhaps

¹ Proc. xxiv.(C), p. 92.

Ardnataggle,¹ in the eastern baronies). Its nearest congener in the west is the pillared dolmen of Ballyganner, with at least three compartments, having pillars rising above the roof-slabs at the two divisions. One pair may have had the lintel now at their feet set on them as a trilithon. A few irregular or circular enclosures, such as the two at Clooney, and others at Ballycahill, Rylane, Ballyganner, Ballybeg, Fortanne, and Dooneen, form a class by themselves and retain no cists inside.

ORIENTATION.

We almost hesitate to use this word where the higher and wider frontage is almost invariably towards the setting sun, "the region of the dead." We also more than question whether any minute accuracy was involved in the laying out of either dolmens or early churches. Save a few striking examples of very "northerly" direction, as at Creevagh, Leanna, the pillared dolmen, and at Poul nabrone (N.N.E. and S.S.W.), the majority "face" more or less to the east or north-east. We have rarely noted any extreme "southward" direction; Deerpark, the axis fully E.S.E., is the most striking.

STRUCTURAL FEATURES.

Raised Blocks.—The only facts bearing on the making of dolmens which we have observed are the cases of carefully raised slabs near them, notably at Parknabinnia. This, with the adjoining Leanna and Cotteen, forms an extensive cemetery, with fifteen dolmens besides cairns and enclosures. Near the third and fourth dolmens, to the west, is a small field, the surface-crags of which have been levered up and propped at one side on rounded blocks of sandstone. The slabs are of exactly the same sizes as those in the dolmens, but have not been dressed on the edges. They have broken into fairly rectangular blocks along the natural lines of cleavage. Owing to the comparative lowness of the sides (rarely shoulder-high, usually three or four feet), there need have been little difficulty (especially where embedded in a cairn or mound) in using the sides as "rails," up which the covers could slide with sufficient leverage. The objection raised as to scarcity of trees does not hold good, as the place-names and the countless stumps in the bogs show that timber was once plentiful along the coast; and several place-names show that the valleys (at least) were wooded in the Burren. Such names as

¹ Proc. xxiv. (C), pp. 124-128.

Feenagh, Creevagh, Gleninshen, Derreen, Iskancullin tell the tale clearly enough. The great free-standing dolmen does not occur; and, as we pointed out, the massive cover of the Derrymore monument very probably lay on a drift-bank, and the sides were inserted by excavation. Borlase advances a theory that, in Irish monuments of several compartments lowering eastward, as at Ballinphunta and Caheraphuca, the covers were got into position by moving them over the lower structures; he then suggests that, in the course of time, the smaller and lighter compartments were removed, leaving the massive western chamber standing by itself. With all deference to his authority, we see little reason for this view—at least in the case of the Clare dolmens.

Dressed Edges and Opes.—In a number of cases the tops of the sides have been chipped so as to give a fairly straight sloping line on which the cover rests evenly. This is noticeable in the dolmens of Berneens (western); Baur (both); Creevagh; Cooleamore; Deerpark; Rannagh (northern); Gortlecka (southern); Cragballyconal (southern); Parknabinnia; Ballyganner; Caherblonick; Cappagh-kennedy, and others. We found no example outside the north-west district. Other traces of “mason-work” are found in the chipped “scoops” in the end-slabs, in the holes and slits in other slabs, and the picking of at least one inner surface. The opes have been regarded as “ghost-doors,” being usually in the ends or partitions of the cists; we have found at Deerpark and Creevagh a scoop and a removed corner in the eastern slab. The exactly similar arrangement of these opes (the scoop in the middle of the north edge, the removed corner to the south) can hardly be accidental; we also note a natural scoop to the north in the east end-slab of Iskancullin dolmen, while at Poulaphuca both top corners are cut away.

The holes in the slabs are probably altogether or partly natural; we find examples in the west end of the south-west cist of Leanna, which was once covered by a cairn, and in the south side at Caherblonick (this last is evidently “worked”), and that of the north cist of Commons.

Akin to these are the long natural slits so carefully selected and arranged opposite to each other in the eastern dolmen of Ballyganner, and the fallen one at Rannagh; one also occurs at Iskancullin. Whatever be the nature of the “ghost-doors,” it is most improbable that they were made after the erection of the dolmen, while the dressed edges, of course, were made before the cover was put upon them. Though the sides seem to have been selected for their

regularity, the covers often seem to have been chosen for the opposite reason, namely, for grotesque outline, curious channels, "footprints," and other strange markings.

We can barely notice the curious slabs, like rude figures, or the very early crosses on Skellig Rock and other early monasteries. That at Coolnatullagh is very small, and stands inside the cist. We cannot learn how that at Ballymihil formerly stood, but it has been set in a rude pier upon the cover of the dolmen since its collapse.

Basins are also found: small ones in the cover of the great "Labba" of Ballyganner Hill and a slab within the annexe of that at Cappagh-kennedy; other and larger basins in sandstone blocks at the dolmens of Newgrove and Kiltanon.

Antæ and Doors.—"Antæ," as Borlase calls them, are formed by setting back the end-slabs, and leaving the ends of the sides projecting. They seem to have "descendants" in the true antæ of the early oratories and even of the later churches down to the tenth century. They are well marked in the dolmens of Ballyganner Hill, Berneens (W.), the White Labba of Cragballyconal, Poulaphuca, Commons, Parknabinnia (iii. and vii.), and Gleninshen, and give a peculiar interest to these tombs, which, with the overhanging "beetle-browed covers," are strikingly like the dolmens of Portugal, Spain, and Corsica.¹ In the first country they are called "antas," it is believed from this feature. A sort of doorway also occurs in the Clare "labbas," as at Gleninshin, Parknabinnia (vi.), and Ballyganner, where the west end-slab does not fill the whole space, but leaves an ope, once closed by a slab which remains in the first-named cist, merely forced outward. Borlase regards the antæ as intended to give the appearance of shrines to the tombs; but we must bear in mind that Parknabinnia (vi.) was, from the first, buried deeply in a cairn which was only removed since 1839, and the "White Labba" was probably buried in a mound.

Modern Examples.—It is interesting to note, if only for a single district, how remarkably the later forms of monument reproduce the earliest types. The simple cist passes without a break from the rude slab-kerbed graves (sometimes covered), such as we find at Kilcameen,²

¹ He produces from the works of Cartailhac and Merimée several striking equivalents in Portugal and Corsica ("Dolmens," vol. ii., pp. 637, 657-665).

² Near Caherminaun fort. It has two cists of slabs set on edge—the northern 7 ft. 3 ins. by 4 ft. 7 ins.; the southern adjoining is 3 ft. 6 ins. by 8 ft., with a western extension 7 ft. long (side, 5½ ft.). The whole in a kerbed mound 14 ft. square, with small pillars to the east. For plan, see p. 469, *infra*.

and in more advanced forms at Aranmore and Iniscaltra. With these we must compare the curious "bone-boxes" of two slabs leaning together with end stones, such as we find at Termon Cronain in Clare; one Kerry example has even the hole or "ghost-door."¹ The oblong form passes (as altar-tombs and free standing box-tombs) through the Middle Ages on to the seventeenth century, where, in many cases (as at Kilfenora² and many monuments outside of Clare), the body actually lay *in*, and not, as in later days was more usual, *beneath*, the stone box. In other examples, where the slab rested on rude blocks or on cut-stone pillars, we recognize the type of the free-standing dolmen. We noticed in Kerry, in the Corcaguiny peninsula, tombs of identical design to the "giants' graves," the latest and feeblest offspring of the mighty line of the "allées couvertes" of the Continent; they were formed of several thin slabs at each side, and slabs at the end, with several covers; they tapered eastward, and were usually covered with a heap of stones. Cairn-burial has never passed out of use. We recall the early British epitaph "Carausius hic jacet in hoc congeries lapidum."³ The tenth-century "Tripartite Life of St. Patrick"⁴ mentions a person who "congregavit lapides ergo sepulchrum." Dr. Whitley Stokes cites the canons of S. Gall (Lib. xiv., cap. ii.) as to cremation and cairn-burial: "Nam ceteri homines sive igni, sive acervo lapidum conditi sunt." Miniature cairns abound in our western graveyards; and we have been warmly thanked for bringing stones when such a heap was being made. The unhewn pillars are of every period; the cist, slab, and pillar or headstone are treated with every degree of elaboration down the later ages; nevertheless they have every claim to be considered the lineal representatives of the prehistoric monuments.

FOLK-LORE.

The local traditions in County Clare are of but little special interest. The names "Labba," or beds, and Labba'iermid, *i.e.*, Leaba Dhiarmadha agus Graine, are most common. The popular opinions mostly favour either the Dermot and Grania legend or the sepulchral origin of the monument. Only two or three have ever been called "Druids'

¹ See a paper by Mr. P. J. Lynch in *Journal R.S.A.I.*, vol. xxxii., p. 47.

² The MacEncharig Tomb has now been opened, and is used as a bone-box. In 1887 it was closed, and one saw the skeleton through a small ope in the end.

³ "Inscrip. Brit. Christianæ" (Hübner), No. 136.

⁴ Ed. Whitley Stokes, pp. 160 and 322.

altars," probably derived from the pseudo-learning of the gentry or surveyors. These cases are the "Druids' altar" at Carnelly, the "cromlech" of Maryfort, where a (doubtful) druid-idea attached some thirty years since, and the "Druids' Altar" at Poulaphuca, a name unrecognized by the people of the neighbourhood, and probably a "sapper-name." The curious malicious sacrifices at or near the two other places have been noted, so far as could be told without giving local offence, earlier in these pages.¹ The name "Altoir na greine" at Callan is traceable only to Comyn's romance about 1750, and may have arisen from a mistake in the name Grania, read by the "light" of the druidical theories. In all cases where the name "altar" was a genuine peasant name, it was used in a Christian sense, and understood, as at Altoir Ultach and Knockshanvo, as a place where the Mass was celebrated in penal times. The Ulster priest who gave his name to the former was (it is stated) of the eighteenth century. The people of Burren, in their remote and hardly accessible uplands, were less molested; and such names are not found; but about Feakle and Broadford there were many traditions; and several Protestant families (especially the Patersons, and in a lesser degree the Westropp and others) enjoyed the repute of having protected the worship and property of their neighbours. We recall vaguely only a few of these legends, though we heard many about 1877. The cist of Tobergrania is supposed to have been "built by the Saints" from Feakle. It is an altar and reputed holy well to this day. So that not paganism, but Christianity, "worshipping in deserts, mountains, and caves," gave these names. On the other hand, probably from the indecent legends told of the flight of Dermot and Grania, a sense of impropriety attached to (at least) the Ballyganner dolmens in 1808, when Dutton was refused by a girl whom he asked to guide him to them. We rarely found any clear ideas about the early lovers; but it was told how Dermot put seaweed on the cover of the labba when he and Grania slept under its shelter; and Finn, learning this by biting his prophetic tongue, imagined that they were drowned, and abandoned their pursuit. The "phuca," a demon goat (or horse), seems connected with Caheraphuca and Poulaphuca, as well as with certain Cork dolmens. Of other offerings than the black cock at Carnelly, we have never heard. The basins at Ballyganner and elsewhere suggest that here, as in Sweden and France, offerings of milk and butter may have once been made. The "Hados" or elves are thus "worshipped"

¹ Proc. xxiv. (C), p. 130.

near the Pyrenees to secure flocks from the wolves. With us the "sidhe" are rather dwellers in the earth-mounds than in dolmens; but certain May¹ and August sports at the "labbas" suggest a possible connexion.

May Eve and the morning of May Day have many milk-and-butter superstitions in Ireland and elsewhere. The Basques carry a "Sitsa" (? Sidhe) figure on May Day, and fasten it to a holy tree. Can the rude figures at Ballymihil and Coolnatullagh be of this nature? As for August, we understand that both in Ireland and in the Pyrenean districts some observance during that month attaches to certain dolmens. The August games at St. Bertrand de Comminges are connected by Borlase with the Sun-God Lug, and the ancient name of the place, Lugdunum, with which he equates the "Lugnasad" festival. In Belgium there are found traces of indecent names and usage attached to dolmens. There also seem to have been malignant rites, to judge from such names as the "Devil's Church" and "Devil's Chair" dolmens; and many of the peasantry stigmatized the Clare offerings as gifts to the evil principle, though this was indignantly repudiated by the families involved. Their connexion with giants is marked not only by the name "Giants' Graves," but by direct legends at Ballynahown and Kiltumper. At the first, a giant, who dwelt in the inland promontory fort of Doonaunmore, "lost his druid's staff," and so was defeated and slain. The belief that he lay with his sword beside him under the giant's grave in the townland led to the overthrow of the monument. The Kiltumper tradition made it the place where a giant or Dane, chased from Cahermurphy fort by the Dalcassians, was slain and buried.

FOREIGN ANALOGIES.

We cannot altogether pass away from the dolmens of the Continent without noting, though very briefly, the similarity (though usually on a larger scale) of these monuments, both in types and names, to our "labbas." We find in Sweden cists with an outer kerbing of slabs, cists in circles and tumuli, passage graves, with round enclosures at the end, like the Irish monuments at Annacloughmullin, Achill, Sligo, and, to some degree, Creevagh in Clare. The Swedish, French, and German dolmens have basins in the covers called "elf-querns" in the first-named country. The Swedish "ghost-doors" are, however,

¹ Theophilus O'Flanagan cites Comyn (1750) for a statement that such sports were held at Altoir na greine on Mount Callan.

far more elaborate than ours. At times they resemble some which we have seen in Scottish brochs, formed by "scoops" out of the edges of two slabs, put together to leave an oval opening.

In Germany we find similar monuments. The mounds in many cases rise just to the level of the roof-slab, as in several Clare cists (*e.g.*, Baur South). The dolmen, tapering and sloping eastward, is common. In Brandenburg we have Giants', Huns', Heathen, or Heroes' graves, bridges, beds, or gates. The latter term recalls the "Gates of Glory" pillars in Kerry. In Ireland, as in Scandinavia and many other regions, the monuments seem to belong to the Neolithic and Early Bronze Ages, though probably, as usual in Ireland, surviving to unusually late times here. The "beetle-browed" cover-slabs are not uncommon in Portugal and Germany.

The French dolmens are too well known to require us to give many details; but they are closely similar to our "labbas" in design and folk-lore. In Holland the popular legends give not only to the giants, but to the strong and gifted dwarfs, a share in the erection of the dolmens. The legends of persons changed into stones, as at Classagh in Clare, show that our "fearbreags" have analogies across Western Europe from the Baltic to the Pyrenees. It would carry us too far from our necessarily brief treatment of the subject to trace the structures and traditions farther afield. Instead, then, of carrying our thoughts through the monuments of Northern Africa, Syria, and Central Asia, past India, out to the dolmens and giants' graves of Japan,¹ we return to the limited field of half an Irish county.

FINDS.

Still more scanty than traditions are the finds in the Clare dolmens. Pottery has often been found in these in the older days of the last century; but it is long since an undisturbed cist has been noted. In our time only one find has been made, that of the gold fibula, near the "labba" of Knocknalappa; but it was not in the chamber: so its connexion is disputable.² At Roughan two skeletons were found in a

¹ For the last group there is a most interesting paper by Mr. W. Gowland, read before the Society of Antiquaries, 1899. He examined 406, some true "giants' graves," some cists in tumuli, others with passages. Their ages varied from the Bronze Age even into the Iron Age.

² It was, amazing to state, buried with its last owner; but Mr. George Scott fortunately has a photograph published in the Limerick Field Club Journal, vol. iii., pp. 27-32. The cover has partly fallen since the date of our former paper, Proc., vol. xxiv. (C), p. 103.

cist with their heads towards the west. They were supposed to be Christians and reburied. The bones of two others were found in the chamber of Shallee cairn. The larger skull in this case was most fortunately preserved. We do not recall any dolmen in Clare, other than apparently that at Croaghane church in Ballinphunta, that has not been opened and searched for treasure.

NUMBER OF DOLMENS IN COUNTY CLARE.

We may now bring together the approximate results of the several sections of our papers on the Dolmens of Clare, the barony of Ibrickan being, so far as we know, devoid of these monuments.

Barony	Small Cists	Dolmens and large Cists	Complex Structures	Enclosures without Cists	Giants' Graves	Sites of undescrbed Cists	Totals
Burren, . . .	7	22	8	5	—	3	45
Corcomroe, . . .	1	7	—	1	—	1	10
Inchiquin, . . .	4	20	4	3	—	3	34
Islands, . . .	—	1	—	2	—	—	3
Clonderalaw, . . .	—	—	—	1	—	—	1
Moyarta, . . .	—	1	—	—	—	—	1
Bunratty Upper, . . .	6	6	2	4	2	3	23
„ Lower, . . .	1	2	—	1	—	3	7
Tulla Upper, . . .	4	17	2	—	3	7	33
„ Lower, . . .	1	8	—	—	4	2	15
Total, . . .	24	84	16	17	9	22	172

There must be added to our list of 1897—

BURREN—Gleninshen, Baur, Berneens, Ballyganner North and Ballyganner South (add two for each). Also Craggagh, Glensleade, Poulbaun, Iskancullin, Creevagh, Rannagh, Termon, Coolnatullagh, and Poulaphuca.

CORCOMROE—Caherminane, Calluragh, two, one in and one “near” Ballyvoe, and Ballynahown (? 2).

INCHQUIN—Teeskagh (2), Parknabinnia (3), Commons, Leanna (2), Tullycommaun, Callan (2), Roughaun, Toormore, Caherblonick, Ballyneillan, Kileurrish (2).

ISLANDS—Ballybeg, Carncreagh.

MOYARTA—Kilkee.

BUNRATTY LOWER—Ballysallagh (?).

TULLA UPPER—Bohatey (3), Fortanne, Kiltanon, Ballycroum, Derrymore, Miltown, Fomerla (2).

TULLA LOWER—Elmhill, Violet Hill.

BURREN.

Mostly simple cists. The largest slabs are at the dolmen of Ballyganner, $17\frac{1}{2}$ feet and $18\frac{1}{2}$ feet long (not 42 feet, as in Hely Dutton's Survey). The dimensions of the cists are given as inside. Sheet of Survey Map in brackets. The † after the name marks a plan in this paper.¹

1. Craggagh (4). Leaba Dhiarmadha. A rock resting on small stones: doubtful. Borlase, i., p. 65.

2. Cooleamore † (5). Defaced; sides made of several blocks; covers gone; 17 feet 9 inches long, 6 feet 8 inches to 5 feet 2 inches wide. R.S.A.I., vol. xxxi., p. 14.

3. Faunaroosca † (5). Complex; a cist $7\frac{1}{2}$ feet long, with a slab enclosure 18 feet or 20 feet long, up to $4\frac{1}{2}$ feet high; much defaced; in a cairn. *Ibid.*, p. 277.

4. Ballyvaughan (5). Site, a small cist of four slabs, 1839; now gone.

5. Ballycahil (5). Site, near Caher; now gone.

6. Ballycahil (5). A boat-shaped enclosure near Caherahoon. *Ibid.*, p. 283.

7. Berneens † (5). Western. Cist; side, $12\frac{1}{2}$ feet; east end, 4 feet 2 inches. For these three, see *ibid.*, p. 286.

8. Berneens (5). Ends of small cist in cairn.

9. Berneens † (5). Eastern. Cist, nearly perfect; $12\frac{1}{4}$ feet long; 7 feet to $3\frac{1}{4}$ feet wide; cover, $13\frac{1}{2}$ feet by $4\frac{1}{4}$ feet by 16 inches.

10. Gleninshin † (5), Northern. Cist, near last; side, $13\frac{1}{2}$ feet; ends, 5 feet 2 inches to 4 feet 4 inches wide. *Ibid.* xxix., p. 381.

11. Gleninshin † (5), Southern. Perfect; $11\frac{1}{2}$ feet long, 4 feet 5 inches to 3 feet 2 inches. Borlase, i., p. 66; called there "Berneens," also in our old lists.

12. Glensleade (5). Very small cist of two cells, in cairn, inside

¹ In the plans herewith given the covers and leaning slabs are dotted, prostrate slabs in outline, fixed slabs hatched. The numbers under the baronies refer to this list.

Caheranardurrish, part of west, 3 feet by 36 inches, with another chamber to east 6 feet long. R.S.A.I., vol. xxxi., page 380.

13. Poul nabrone† (5). Fine example, sides partly fallen, $9\frac{1}{4}$ feet by $4\frac{1}{4}$ feet to $3\frac{3}{4}$ feet wide, cover 13 feet by 6 feet by 10 feet. *Ibid.*, vol. xxix., pp., 374, 378.¹

14. Baur, North† (9). Defaced, $16\frac{1}{2}$ feet long, 9 feet to $5\frac{3}{4}$ feet wide.

15. Baur, South† (9). Double-lined cist, outer $7\frac{3}{4}$ feet by $4\frac{1}{2}$ feet, inner 3 feet deep; its cover forms a shelf; it is 3 feet 8 inches wide inside. *Ibid.*, p. 369.

16. Poulbaun (5). Collapsed, near a caher; cover, 12 feet by 7 feet. *Ibid.*, vol. xxix., p. 373.

17. Ballymihil (5). Collapsed; curious slab on it; cover, $11\frac{1}{2}$ feet by $7\frac{1}{2}$ feet to 6 feet. *Ibid.*, p. 373.

18. Cragballyconoal† (5), Northern. In mound; sides and cover thin, 10 feet 4 inches long, 4 feet 10 inches to 3 feet 10 inches wide. *Ibid.*, p. 372.

19. Cragballyconoal† (5), Southern. The "White Labba"; sides and ends only, 11 feet 10 inches long, $5\frac{3}{4}$ feet wide. *Ibid.*, p. 372.

20. Poulaphuca† (6). Perfect, 7 feet 2 inches long, $4\frac{1}{2}$ feet to 4 feet wide; cover, $9\frac{1}{4}$ feet. *Ibid.*, p. 374.

21. Poulaphuca (6). Remains of small cist in mound.

22. Moheramoylan (9). Collapsed, and nearly buried; cover, $14\frac{1}{2}$ feet by $9\frac{1}{2}$ feet by 10 inches. *Ibid.*, vol. xxxviii., p. 366.

23. Carran (9). A cist of four slabs in cairn, 1839; now covered.

24. Iskancullin† (9). Complex; cist, $8\frac{1}{2}$ feet by $5\frac{1}{4}$ feet to $4\frac{3}{4}$ feet in a slab-enclosure of eighteen stones; straight to ends; and north curved to south 23 feet long by 12 feet. See *ibid.*, xxxi., p. 285.

25. Noughaval (9). Cist, to west of Cahercuttine. This is a very doubtful monument; an enclosure of rugged little slabs and pillars, about $7\frac{1}{2}$ feet square, with a division. To the west of it there is a set slab like the end of a cist.

26. Noughaval (9). Near last; defaced cist, 12 feet long, 7 feet wide. *Ibid.*, vol. xxvii., p. 117. Two covers and several blocks now thrown about, and dug up.

¹ Dr. MacNamara tells me that he heard from Mr. Patrick Davoren that his uncle, nearly eighty years ago, to show his strength, tried to tilt up the cover of this dolmen from below, when, to his horror, the west end-slabs fell out, leaving the great cover balanced as now on the sides.

27. Ballyganner, North (9). Doubtful, slab enclosure in ring-wall.

28. Ballyganner, North † (9). "Pillared dolmen," three compartments, 8 feet 2 inches, 3 feet 8 inches, and 13 feet long, with pillars between, kerbed line to north. See R.S.A.I. Guide, v., p. 56; Journal xxxi., p. 288; and *supra*, vol. iii., ser. vi., p. 544. Plate X.

29. Ballyganner, North. Fallen sides, 9 feet 7 inches and 9 feet 9 inches long. Rock-cut road to it from Caheraneden. R.S.A.I., vol. xxxi., p. 288.

30. Ballyganner, North † (9). Nearly perfect, in ring-wall, with souterrain running into it, 16 feet long, 7 feet 6 inches to 2 feet wide. *Ibid.*, p. 288, and Trans. R. I. Acad., vol. xxxi., p. 653.

31. Ballyganner, North (9). Remains of small cist in cairn.

32. Ballyganner, North (9). A doubtful slab enclosure, near Caheraneden. R.S.A.I., vol. xxvii., p. 120.

33. Ballyganner, South † (9). Slab enclosure, near Caher gate, buried in mossy stones, 11 feet by 10 feet; a doubtful monument, but not residential.

34. Ballyganner, South † (9). Perfect, in mound, 12 feet 7 inches long, 6 feet to 4 feet 6 inches wide. *Ibid.*, vol. xxxi., p. 288.

35. Ballyganner, South † (9). On Hill. Dolmen, 14 feet long, 9 feet to 7 feet wide; sides, $17\frac{1}{2}$ feet and $18\frac{1}{2}$ feet long; cover was 18 feet by 13 feet, with basins. Borlase, i., p. 67; R.S.A.I., vol. xxxi., p. 288.

36. Deerpark, Poulquillaca † (9). Complex; 18 feet long; 7 feet to 5 feet wide, with two chambers and fence of slabs 18 feet long in all. See Borlase, i., p. 70.

37-39. Fanygalvan † (9). Complex; three cists, three pillars, and mound. The largest, 21 feet long, with two cells, 12 feet and $5\frac{1}{2}$ feet long, from $6\frac{1}{4}$ to $4\frac{1}{2}$ feet wide. The second, a collapsed cist to west, and 10 feet long. The third to west of last, defaced, 6 feet long, and in line. R.S.A.I., vol. xxxviii., p. 360.

40. Rannagh † (6). Defaced, $15\frac{1}{2}$ feet long, $8\frac{1}{2}$ feet to $7\frac{1}{2}$ feet wide. *Ibid.*, vol. xxxv., p. 224.

41. Rannagh † (6). Fallen; about $6\frac{1}{4}$ feet long, $4\frac{1}{2}$ feet to $3\frac{1}{2}$ feet wide; sides, $8\frac{1}{2}$ feet long. *Ibid.*, vol. xxix., p. 381; vol. xxxv., p. 224.

42. Termon † (10). Perfect; $9\frac{3}{4}$ feet long, $3\frac{1}{4}$ feet to $2\frac{1}{4}$ feet wide. *Ibid.*, vol. xxix., 381, called "Rannagh," and vol. xxxv., p. 244.

43. Coolnatullagh † (6). Perfect; $7\frac{1}{2}$ feet to $6\frac{3}{4}$ feet long, 3 feet 7 inches wide. *Ibid.*, vol. xxix., p. 382.

44. Cappaghkennedy † (10). Complex, 8 feet by $6\frac{1}{2}$ feet to 5 feet, and 18 feet long over all, having two chambers and fence of slabs, with basins, &c., near a caher.¹ *Ibid.*, vol. xxxv., p. 233, Borlase, i., p. 72.

45. Creevagh † (10). In a ring-wall, 12 feet thick and $3\frac{1}{2}$ feet across garth, with rock-cut road, 110 feet long, 12 feet to 16 feet wide to north-east. It is complex. A cist, 14 feet long, from $4\frac{1}{2}$ feet to 3 feet 10 inches wide. A small chamber to east, and little slab enclosures to sides. At west end is an irregular enclosure 7 feet across, with pillar slabs from 5 feet to 7 feet high.² R.S.A.I., vol. xxviii., pp. 357-9, and xxx., p. 217.

CORCOMROE.

1. Ballynahown (4). A reputed "labba" near Caherdoon. We only found slabs. *Ibid.*, vol. xxxv., p. 351.

2. Ballynahown (4). "The giant's grave," in a walled hollow, rows of large stones, and entrance. *Ibid.*

3. Cahermacrusheen (8). Collapsed; $9\frac{1}{2}$ feet long, 5 feet to 4 feet wide; cover, $9\frac{1}{2}$ feet by 7 to 8 feet, and 6 inches by 10 inches thick; in a cairn, near Caher. Borlase, i., p. 80.

4. Ballyvoe (8). A doubtful, but dolmen-like enclosure, close to a ring-wall.

5. "Near Ballyvoe." A small cist in a cairn, removed; could not get site fixed.

6. Ballykinvarga (9). Collapsed; large cover, with sides underneath; near the great caher and abattis.

7. Caherminane † (9). 12 feet 8 inches long, $5\frac{1}{2}$ feet wide; covers gone. Borlase, i., p. 72; called "Kiltennan."

8. Caherminane † (9). Three cists in Kilcameen, ring-wall; the

¹ The traditional Mohernacartan, the residence of the three-armed smith Lon mac Liomhtha (R.S.A.I., vol. xxv., p. 277). This dolmen and the larger ones at Commons and Gortlecka, and probably Slievenaglasha, were inhabited far down the last century. Borlase omits the partition in his plan of Cappaghkennedy.

² This is suggestive of the more regular structures at Clontigora and Annagh-cloghmullen, in Ulster; Achill and Deerpark (Sligo), in Connaught; and various dolmens in Spain, Portugal, Sardinia, and Brandenburg. Borlase equates such pillars with the "custodes" at dolmens in the latter place ("Dolmens," ii., p. 30). Colonel Wood-Martin gives a plan of a monument at Streedagh, in Sligo, a tapering cist, with an outer enclosure of slabs, 35 feet across, in a cashel, about 100 feet in diameter, which seems closely similar to Creevagh. ("Rude Stone Monuments," pp. 146, 140.)

north, $7\frac{1}{2}$ feet long, the west 7 feet, the east 8 feet, and $3\frac{1}{2}$ feet wide, in a kerbed mound, $14\frac{1}{2}$ feet square. R.S.A.I., vol. xxvii., p. 125.

9. Clooneen †(9). On edge of Ballyganner, South. Perfect; 14 feet long, $5\frac{1}{2}$ feet to $3\frac{1}{4}$ feet wide; cover, $15\frac{1}{4}$ feet to $8\frac{1}{4}$ feet; south side, $15\frac{1}{4}$ feet long. Borlase, i., p. 80.

10. Calluragh (25). Near Lehinch; cist half removed. R.S.A.I., vol. xxxi., p. 437.

INCHIQUIN.

1. Knocknalassa, Mount Callan†(31). Perfect; sides, $10\frac{1}{2}$ feet and 7 feet long, $5\frac{3}{4}$ feet to 5 feet wide; cover, 10 feet by $7\frac{1}{2}$ feet by 10 inches. "Altoir na Greina," Borlase, i., p. 79; Knott's "Kilkee" (1836), p. 161. J. Windele's ms. "Topography" (R.I.A., 12 C 3, pp. 746-7).

2. Knocknalassa, Mount Callan (31). Removed. A cist, with pillars at corners, R.I.A. Proc., ser. ii., vol. i., pp. 166, 269, 315. "Limerick Field Club Journal," vol. ii., p. 252.

3. Knocknalassa, Mount Callan (31.) A third, stated by Lewis to exist; perhaps only the ogham slab; doubtful.

4. Tullycommaun¹ †(10). Cist noted by Borlase, i., p. 73. We failed to find it. It is not that at Knockauns Fort, as stated. Sides, $9\frac{1}{2}$ feet and 8 feet 8 inches long, 4 feet to $2\frac{1}{2}$ feet wide.

5. Tullycommaun †(10). At Knockauns Fort, double-walled cist, half removed, 10 feet long; cover, 11 feet by 6 feet. R.S.A.I., vol. xxxv., p. 218.

6. Tullycommaun (10). Giant's Grave, slabs in a pear-shaped mound, 33 feet by 14 feet. *Ibid.*, p. 219.

7. Slievenaglasha² †(10). Defaced cist; sides, north, 15 feet; south, 11 feet long, and $5\frac{1}{2}$ feet to 4 feet apart. Borlase, i., p. 74.

8. Teeskagh³ †(10). Cist, in a cairn, $6\frac{1}{2}$ feet by 22 inches to 26 inches wide. R.S.A.I., vol. xxxv., p. 214.

9. Cotteen, or Commons †(17). Perfect cist, $9\frac{1}{2}$ feet long, $4\frac{1}{2}$ feet

¹ Either this dolmen or that of Cappaghkennedy was called Leabanaleagh or Leacnaleagh, according to Borlase ("Dolmens," i., p. 73). See also Leabaleaha, in Kerry, a paper by Mr. P. J. Lynch, R.S.A.I., vol. xxxii., p. 338; also Dr. Joyce's "Irish Names of Places," ser. ii., chap. iv., p. 107; and Leabanalaich, Co. Cavan. The Knockauns Fort dolmen seems to have been called "Carrickaglasha" to Borlase; but I heard neither name on the ground.

² Probably the Tullynaglashin of Dutton, and Knownaglaise of Miss Stokes.

³ Not the dolmen of that name given by Miss Stokes.

to $3\frac{1}{2}$ wide; cover, $12\frac{1}{2}$ feet by $8\frac{1}{2}$ feet; south side, 13 feet 10 inches long. Borlase, i., p. 76.

10. Cotteen, or Commons † (17). Defaced cist, hole in side; sides, $8\frac{1}{2}$ feet and 10 feet long, 6 feet apart. Borlase, i., p. 75; called "Leanna."

11. Leanna (17). "Dermot and Grania's bed," marked 1839. Only an old house-enclosure on site. Perhaps a mistake for No. 12.

12. Leanna (17). Collapsed. Slabs: cover, 9 feet 8 inches by 6 feet 4 inches; south, 9 feet 8 inches; and north, 10 feet by $6\frac{1}{2}$ feet 7 inches.

13-15. Leanna † (17). Three cists, north-east, 6 feet 9 inches by 24 inches to 22 inches; next removed; third, south-east, 5 feet long, 27 inches wide; in cairns.

16. Leanna † (17). Western cairn; cist, 12 feet by 5 feet to $2\frac{3}{4}$ feet wide; holed stone and slab enclosure. See Borlase, i., p. 75. The whole group is described, R.S.A.I., vol. xxx., p. 214.

17. Parknabinnia, or Reabachan Hill (16), i. Defaced, south side, 15 feet 10 inches long, 5 feet 9 inches high to west, $2\frac{1}{4}$ feet to east, 9 inches thick.

18. Parknabinnia, or Reabachan Hill (16), ii. Defaced cist of three rude blocks, west and south, 6 feet long, 2 to north, 100 feet to west of last.

19. Parknabinnia, or Reabachan Hill † (16), iii. Perfect, 10 feet by $6\frac{1}{4}$ feet to $5\frac{1}{2}$ feet wide; sides, $14\frac{3}{4}$ feet and $14\frac{1}{2}$ feet long.

20. Parknabinnia, or Reabachan Hill † (16), iv. Small cist, 7 feet by 4 feet to 1 foot wide in low mound, with circle of seven slabs, 12 feet by 8 feet, and about 3 feet high.

21. Parknabinnia, or Reabachan Hill † (16), v. On hill. Perfect, $10\frac{1}{4}$ feet to 13 feet long, $5\frac{1}{4}$ feet to $2\frac{1}{2}$ feet wide, with a northern side enclosure, and ring of six slabs.

22. Parknabinnia, or Reabachan Hill † (16), vi. Perfect; once covered by cairn, $9\frac{1}{4}$ feet long, and $5\frac{1}{2}$ feet to $4\frac{1}{2}$ feet wide; sides, north, 15 feet; south, 12 feet long.

23. Parknabinnia, or Reabachan Hill † (16), vii. Cist in cairn, $7\frac{3}{4}$ feet long, 26 inches wide; cover removed.

24. Roughan (16). Cist: cover, $5\frac{1}{2}$ feet long by $3\frac{1}{4}$ feet; two skeletons found in it, about 1885, by Mr. G. Fitzgerald.

[The groups of Commons, Leanna, Parknabinnia, and Roughan may be called the Reabachan group. For Parknabinnia dolmens see R.S.A.I., vol. xxviii., p. 359; xxxv., p. 214; for No. vi. see Borlase, i., p. 77.]

25. Ballycasheen † (16). Complex. It has two chambers, wider to the east, and traces of a third to the west, and, perhaps, a separate one to the south. It is $13\frac{1}{2}$ feet long, 6 feet to 9 feet wide, and 22 feet over all, in a low mound, with a slab kerb. ¹See Borlase, i., 78. R.S.A.I., vol. xxxv., p. 222.

26. Caherblonick † (16). Collapsed. Hole in side; 20 feet long, 10 feet wide, near caher, R.S.A.I., vol. xxxv., p. 210.

27. Gortlecka (17). Northern. Defaced cist. West end in cairn.

28. Gortlecka † (17). Perfect; 12 feet by $4\frac{1}{2}$ feet to $3\frac{1}{4}$ feet wide in cairn. *Ibid.*, p. 218.

29. Toormore † (25). Defaced; 7 feet long, about 5 feet wide. *Ibid.*, pp. 212-214.

30. Dromore (25). A cist, with its cover, is stated to exist in the woods.

31. Moyree Commons, or Adroon † (18). Curious cist, $6\frac{1}{2}$ feet by 5 feet, divided into a triangular and a "lozenge"-shaped cell in cairn; the pillar-slabs are—north, 9 feet 8 inches; south, $6\frac{1}{4}$ feet and 5 feet. See R.I.A. Proc., vol. iv., ser. iii., p. 545. Plate ix.

32. Kilcurrish † (25). Cist of several blocks, 8 feet 9 inches by 3 feet 6 inches; cover, 6 feet 8 inches by $5\frac{1}{2}$ feet. Described below, p. 467.

33. Kilcurrish (25). Fallen cist; cover, 6 feet 3 inches by 5 feet; sides, $7\frac{1}{4}$ feet and $6\frac{1}{4}$ feet; near a caher.

34. Ballyneillan † (33). Near Shallee, chambered cairn. R.S.A.I., vol. xiii., consec., p. 160; vol. xiv., p. 12. Described below, p. 467.

ISLANDS:

1. Carnelly (42). Pillar-slabs beside a ring-mound. Described below, p. 467.

2. Ballybeg † (41). Circular enclosure near a caher. Described below, p. 468.

3. Carncreagh † (39). Cist, 13 feet long, $6\frac{1}{2}$ feet to $2\frac{3}{4}$ feet wide, of eight thin slabs, 17 feet 2 inches long in all; one cover remains, and a side line of slabs to north. See "Limerick Field Club Journal," vol. ii., pp. 253-5.

¹ It was overthrown before 1808 by a Protestant clergyman looking for treasure.—Hely Dutton.

CLONDERLAW.

1. Kiltumper † (48). Cairn, 11 feet by 15 feet across, with kerb of small blocks, only $3\frac{1}{2}$ feet to 3 feet long. "Limerick Field Club Journal," vol. ii., 253-5.

MOYARTA.

1. Kilkee (56). Fallen cist; cover, 6 feet 7 inches by 5 feet 3 inches by 12 inches; under slab, $5\frac{1}{2}$ feet by $5\frac{3}{4}$ feet by 1 foot. Behind Moore's Hotel.¹

In addition to these, we may name the following cairns which have not been explored, and may contain chambers or cists:—

BURREN.—1. Turlough Hill, near the great fort; 2. Slieve Carran; 3. Poulawack, kerbed at base; 5. Cappaghkennedy; 6 and 7. Ballyganner North, near Caheranedan.

CORCOMROE.—1. Cairnconnaughtagh, supposed to be the inauguration-place of the chiefs of Corcomroe, Cairnmaetail; 2. Cloneen, earth.

INCHIQVIN.—1. Leanna; 2. several along the Glasgeivnagh Hill; 3. Kilcurrish; and 4. Carran near Ennis, near Ballyneillan, yielded fragmentary bones.

¹ In this list I am indebted to Dr. G. U. MacNamara for directing me to the following:—Baur (2), Coolnatullagh, Parknabinnia (4), Teeskagh, Roughan, Toomore, Caherminaun, Adroon, Kilcurrish, and (I believe) the south dolmen of Gleninshen. Mr. James Frost told me of Iskaneullin; Mrs. Tufnell Oakes, of the fallen dolmen at Kilkee; Miss G. C. Stacpoole, of Ballybeg; Miss D. Parkinson, of Calluragh. The surveyors of the later maps added (besides several to which we called their attention) those of Berneens (West), Noughaval (2), the pillared dolmen, Ballyganner South (West), Termon, Carncreagh. We found the following when going over the district:—Ballycahil enclosure, enclosure and slab structure at Caheranedan, Rannagh and Poulbaun (fallen), Ballyganner North, Caheracuttine, Berneens, and Glensleade, Poulaphuca cist, Parknabinnia (vii), Leanna, and others, Creevagh and Kilcurrish. Mr. Borlase seems to have first recorded Craggagh, Tullycommaun (not yet verified), and Commons, North. Of the others, thirty-three, in Western Clare, were on the maps of 1839.

APPENDIX A.

SOME UNDESCRIBED MONUMENTS.

KILCURRISH (25). Two cists, not marked on the Survey. One on the ridge to the north of Kilcurrish Church has fallen; the shapely sides, 7 feet 2 inches, and over 6 feet long, are under a cover, 6 feet 3 inches by 5 feet. A curious rock lies to the west, and beyond it a dilapidated ring-wall, 130 feet from the cist. The caher is 111 feet in diameter east and west, 102 feet north and south inside; to the west, on a hill, is a cairn of large slabs, 57 feet across, and 8 feet high. The second cist lies in the valley north from the ridge. The sides consist each of two large, coarse slabs, with end-slabs and one cover (formerly two). The chamber is 9 feet 10 inches by 4 feet over all; the cover, 6 feet 8 inches by 5 feet, and, like the sides, from 10 inches to 14 inches thick.¹

BALLYNEILLAN.—This chambered cairn lies over three miles from Ennis, near Shallee Castle, upon a bushy crag. It is shown on the new Survey map, near "Poulee," lying due north from the conspicuous cairn on Carran Hill. It is a heap of moderate-sized stones, about 74 feet across, and was entire till 1874, when, in removing the stones for road-metal (with permission of Mr. W. Kelly, of Craglea), some workman broke into its chamber, nearly in the middle of the heap. The Rev. Patrick White, c.c., of Ennis, hearing of this, visited the spot and secured a skull, which had been broken in two, but otherwise well preserved. Dr. Charles James examined the bones, which proved to be of two persons, the smaller probably a woman. The late Mr. John Hill, c.e., and others described the find to the Archæological Association at Kilkenny, but no plans were published. The chamber had a clay floor; and we found small fragments of bones very friable and white. The structure is irregularly hexagonal in plan, lined with upright slabs from 3½ feet to 4 feet high over the debris; above these projects a corbelling, the contracted space overhead being covered with larger slabs. The cell is rarely over 5 feet long in any direction. It is in Kilnamona parish in Inchiquin.

CARNELLY.—A megalithic monument entirely overthrown. It lies beside an earthen ring, with a central garth; the ring is 12 feet to 15 feet wide; the garth, 96 feet across; there is a slight trace of a

¹ The first was mentioned to Dr. MacNamara; when searching for it, we found the second in a clearing among the hazels.

fosse to the south-west, and within the ring, all being much defaced by a plantation. Three pillars remain, two together, $10\frac{1}{2}$ feet by 15 inches to 13 inches wide and thick, and 6 feet 7 inches by 26 inches square at the ends, and 32 inches in the middle. The third rests at its east end upon these; it is 9 feet long, 20 inches wide, and 13 inches thick. Another small pillar, $5\frac{1}{2}$ feet long, lies a little distance away. They were probably a group of rude stone pillars removed from the ring. It is much as we first remember it in 1875. The curious story of the sacrifice upon it is given in our preceding paper dealing with Clare cists.¹ An imaginative poetical version² tells of a sacrifice by "a maiden on a coal-black steed" circling the grove thrice, and sprinkling "with human gore" the "stone unhewn by human hands, stone hither brought from distant lands"; but the legend is re-cast, combined with the authentic legends of the Stammers and Quin Abbey, put back some fifty years before the Stammers obtained the place, and absolutely valueless. The place lies in Clare Abbey Parish, and once belonged to that monastery.

BALLYBEG.—On the opposite side of the Fergus, but in the same parish, on a ridge not far from the Newhall cave, recently excavated by Mr. Richard Ussher,³ is a monument. It is an octagonal enclosure of some eight stones of irregular height (up to 4 feet high, and 3 feet wide), and is about 13 feet across. The stones have the flat faces inward, and the tops and faces have evidently been a long time exposed to the weather. There are traces of a cairn round them. They lie near a stone ring-wall, which, with three others and an earthen rath, lies on the ridge between the ancient "Pilgrim's Way" to Killone Convent and Ballybeg Lake.

BALLYSALLAGH WEST.—This lies in the Barony of Bunratty Lower, not far from the west of Kilnasoola church, and to the *east* of "Ballysallagh East"! In a tilled field, near the road, we find a large block of coarse sandstone lying over certain prostrate stones, one a limestone slab of some size: it is very probably a fallen dolmen. If so, the cover is 11 feet long by 6 feet to 7 feet wide, and 31 inches thick.

FOMERLA.—In the Barony of Upper Bunratty. I have recently examined the spot, and find the evident remains of two very small cists. The better preserved, 3 feet wide and 4 feet long; the south side, 18 inches thick; north side out of place. To the west is an end

¹ Vol. xxiv. (C.), p. 130.

² By the Duchess de Rovigo, 1838.

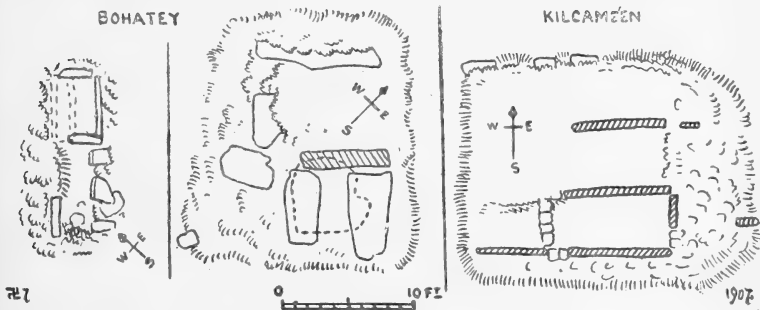
³ Trans. R. I. Acad., xxxiii. (B.), pp. 13–16.

block of a second cist, 4 feet 7 inches long, 3 feet 3 inches high, and 13 inches thick. The supposed remains of a third seem to be a natural rock.

MILTOWN.—I found the sides of the blown-up cist ("f," *supra*, vol. xxiv., p. 112) in a low mound, 15 feet long north and south, 9 feet east and west. It was a small cist, 3 feet 6 inches wide and long to 2 feet 6 inches wide.

FORTANNE.—It is in the barony of Tulla Upper, and near the cist of Maryfort. It is the remnant of a slab enclosure on a low mound, partly of small stones. Five slabs are visible; but some are partly buried or overgrown. The enclosure was somewhat oval, and varies from 25 feet to 29 feet across. The larger slabs are 7 feet by 3 feet by 1 foot; 6 feet by 2½ feet by 8 inches, and 4½ feet by 15 inches by 18 inches, the rest being much covered. It is of the class found at Clooney and Ballyganner monuments, of doubtful purport to our present "knowledge."

BOHATEY.—This townland belongs to that part of Iniscaltra recently restored to Clare from Galway. The monuments lie not very far from Cappaghbaun dolmen, and command even a finer view lying



CISTS OF BOHATEY AND KILCAMEEN.

on the heathery hills to the north of Lough Derg, and looking over it out to the Devil's Bit, the Galtees, and even to Mount Brandon in Kerry, nearly 100 miles away. From the summit behind the dolmens, I am told that the Connemara mountains are visible across Galway Bay, some 70 miles to the north-west.

The chief dolmen was first noticed by Captain Hibbert in the *Journal* of the Limerick Field Club when describing a bronze spear, with a curious looped shank,¹ which was found in the bog below.

¹ *Journal Limerick Field Club*, vol. i., No. 2, p. 47.

The chief dolmen faces much towards the north of east; but let us describe it for simplicity as truly orientated. The north side is *in situ* a strong slab of pink-grey conglomerate, 6 feet 7 inches long and 4 feet high, and 12 inches to 19 inches thick. Evidently the opposite side fell while the ends were standing, and some one placed a large block upon it; the ends then collapsed, and the cover rests with curious effect on the block. The ends are 5 feet 6 inches to 5 feet 9 inches long, and 30 inches to 42 inches wide. The cover is about 5 feet 7 inches square and 1 foot thick. Round the chamber are several other blocks and a low pillar as at Altoir Ultach and Cappabaun.

About 300 yards to the north-east is the "giant's grave," a narrow cist of thin slabs, 2 feet to 5 feet 3 inches long. It is of two compartments, 6 feet 5 inches and 5 feet 3 inches long, and 3 feet wide. It is nearly hidden in heather and filled with water; the covers are removed.

The third "giant's grave" lies about as far to the north-west of the first; it is embedded in a mass of furze, a bright speck on the brown hillside. We could not plan it, but located the blocks, and between them a hollow, 7 feet by 4 feet wide. It lies close to a knoll near the mearing trench of Glenwanish. Higher up the hill of Ardeevin is a pile of naturally-loosened slabs of exactly the shape and size of those used in the dolmens.

APPENDIX B.

PILLARS AND BASIN-STONES.

The pillar-stones included in this paper (save Creevagh) are more probably terminal than monumental.

FANYGALVAN.—Burren (9) near the three cists, and about 80 feet to the north near a low burial-mound. They lie in line from north-north-east to south-south-west. The central pillar is over 7 feet high, the side ones about 4 feet. Several cahers and souterrains lie on the slope above.

CREEVAGH.—Burren (10). The pillar is actually part of the dolmen. It is 6 feet high, 4 feet 7 inches wide, and 10 inches thick.

COAD, Inchiquin (17), near Corofin. A large rather palmate slab, $7\frac{1}{2}$ feet high, 1 foot 5 inches wide at the foot, and 12 inches thick; 2 feet 4 inches wide at the top and 8 inches thick. $2\frac{1}{2}$ feet of the length was set in the ground when, on October 13th, 1894, it was re-erected by Dr. George U. MacNamara and his brother, Major

William MacNamara. They found no traces of burial at its foot. It may mark the limit of the lands of Coad church, lying in line with that building to the east. The name of the townland, Comfhod ("equal length"), usually means "tombstone." It had been overthrown by a Kilnaboy treasure-seeker in 1854, and is locally called "Clochaliagaun."

TERMONROE, Clonderalaw (48), near Kilmihil. Two pillars, each 7 feet 4 inches high, stand on a rising ground near a fort called Kilbride. They are probably "termons," either of a lost church of St. Brigid or of Kilmihil church. The defaced ring-wall of Cahercanavaun lies to the north-west near a stream.

KNOCKNAFEARBREAGA, Bunratty Upper (26). At Classagh. These pillars are described before (vol. xxiv. (C.), p. 97). Since this was published, Mr. R. Twigge, F.S.A., called my attention to a fragment of the Life of St. Mochulla in "Analecta Bollandiniana," xvii., p. 135. This Life was vainly sought by Colgan 270 years ago; and it is interesting to find the saint's tame bull that could repel *thieves* and wolves, which figures in the local legend of the pillars. This shows well the persistence of accurate tradition in Clare. Had we the whole book-legend, we might even find the robbers' "petrification," as in the Life of St. Declan, &c.

BASIN-STONES OR BULLAUNS.—So far as we have noted, the following exist in Clare, but there may be very many others. Of these twelve are in burial-places; seven (including groups of five and more) at dolmens. Most are in sandstone blocks.¹

BURREN.—Cappaghkennedy (five at dolmen); Ballyganner (in dolmen cover).

INCHIQUIN.—Tullycommaun (near fort); Correen (natural rock, a holy well); Leanna (several near oratory and cell); Kinallia (near oratory).

ISLANDS.—Kilquane (in a killeen); Clare Abbey (in abbey); Killone Lake at south-east corner.

BUNRATTY UPPER.—Magh Adhair (near mote); Kylëane (called Doughnambraber, in a killeen); Kilvoydan, Ballyvergin, Fomerla (in a killeen), Fiaghmore (two); Ratheloooney (two).

¹ Notes on the Clare bullauns may be found—Leanna (Dr. G. U. MacNamara), R.S.A.I., vol. xxvii., p. 77; Kylëaan (Killian on map) (Miss G. C. Stacpoole), *ibid.*, xxxiv., p. 190, and (a list by us) p. 191. There is a flattish shore-stone hollowed into a shallow saucer in the Saint's church near Ross in Moyarta, hardly a true bullaun.

BUNRATTY LOWER.—Caherscooby (in fort); Tomfinlough (near church, a holy well); Crossagh, Rossroe Castle.

TULLA UPPER.—Tyredagh (near a killeen); Newgrove and Kiltanon (at dolmens); Bodyke Hill, Rannagh (two); Moynoe (near church).

TULLA LOWER.—Kiltinanlea (near church).¹

CORRIGENDA AND ADDENDA TO PREVIOUS PAPERS.

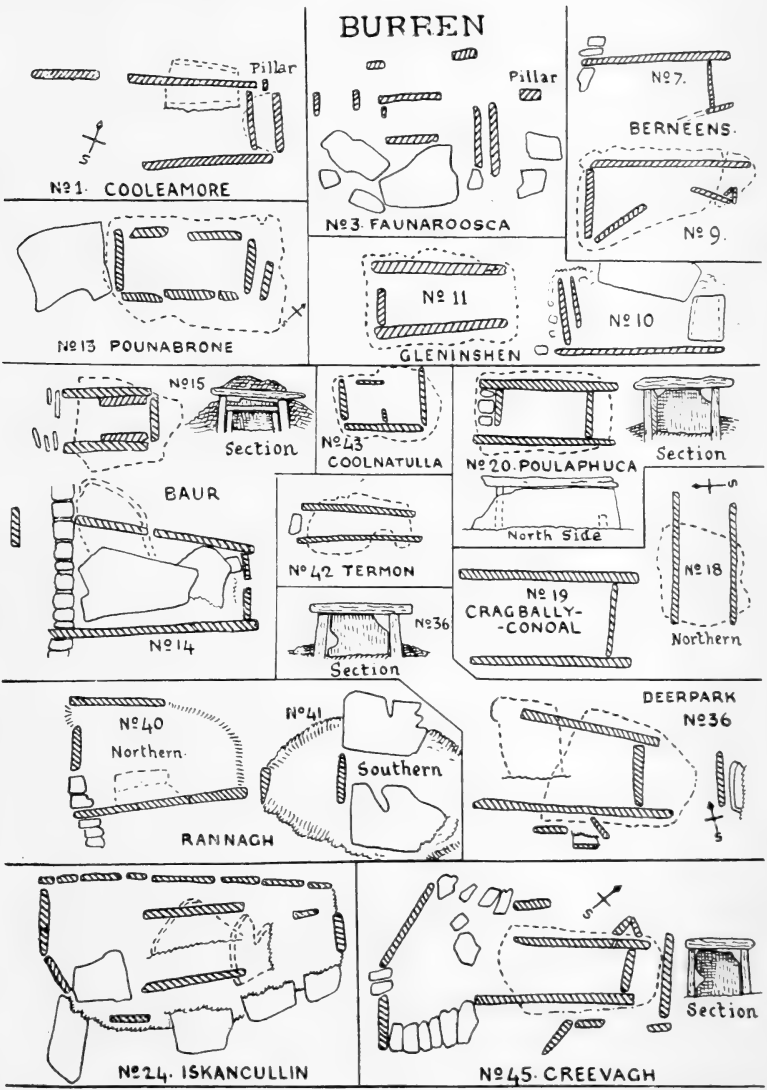
CASTLES AND PEEL TOWERS OF COUNTY CLARE.—(Proc., Ser. iii., vol. v., p. 362.) *Add to* CORCOMROE, Knockfin, on edge of Ballyvoe, 1655, probably at AranView. INCHIUIN, Doonmulvihil. CLONDERALAW, Donogroge. BUNRATTY UPPER: Dyncley, in 1680, sketched a “Clownherne,” probably Deepark Castle, next Clownherna. BUNRATTY LOWER, Ballysallagh f., Ballycullen, and Rathfoland f. *Correct*, p. 363, “Elmhill *or* Doonass” to “Elmhill *and* Doonass”, the latter castle being shown as at the “Turret” rock, on the Shannon, in the map of 1655.

CHURCHES OF COUNTY CLARE.—(*Ibid.*, vol. vi., p. 109) “Inghean Baoith”: *add* “Her name was Findclu, and her date the seventh century”; p. 112, “Iniskefty” is, of course, Askeaton; p. 138, Killagleach and Uetforaich correspond to the rectory of Glæe in 1419 (Cal. Papal Registers, vii), Uetforaich being the “Wafferig” of 1302, the modern Oughtdarra; p. 148, Kilmacreehy is called Kyllmeichrichenatraga “of the strand”; and Collebonoum, 1302, is Colleboum or Kilmurry Ibrickan church at “Oxmout” (de colle bovum) in the Papal Registers.

ANCIENT FORTS.—(*Ibid.*, xxiv. (C), pp. 233, 268), *for* “Killare” *read* “Kildare”.

CASTLES OF COUNTY LIMERICK.—(*Ibid.*, xxvi. (C), p. 233), section 361, Grange. The sentence “Morrogh mac Brien . . . 75 B”, to be put to next section under Ballypierce; p. 235, Mahoonagh. After “M^cEscott held the castle”, *add* “which was betrayed by a servant and the occupants taken in their sleep”.

¹ I must thank Dr. MacNamara, Mr. James Frost, Miss G. C. Stacpoole, Miss D. Parkinson, and Mrs. Tufnell Oakes for help and information about the western remains; and Rev. J. B. Greer, Mrs. O’Callaghan, Colonel O’Callaghan Westropp, Mr. James Going, Mrs. Gore, and Captain Hibbert about those of the “eastern half.”



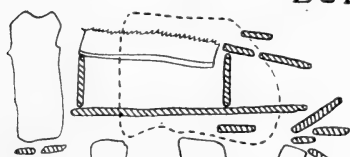
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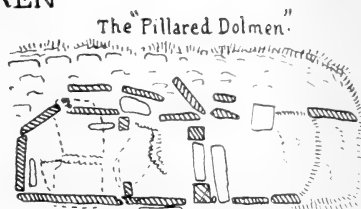
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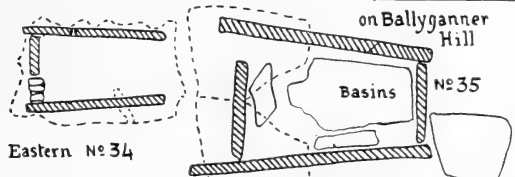
BURREN



No. 39. FANYGALVAN



No. 28 BALLYGANNER NORTH



Eastern No. 34

BALLYGANNER SOUTH

on Ballyganner Hill

Basins

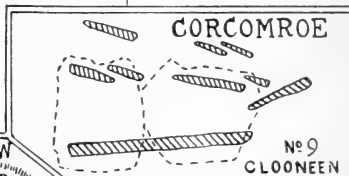
No. 35

Cave

No. 30. in a Cave



No. 34. Elevations



CORCOMROE

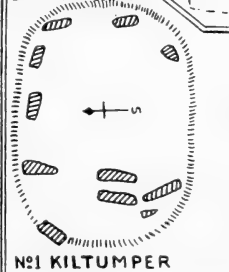
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CLOONEEN



Slab Enclosure No. 33
near Western Caher

CLONDERALAW



No. 1 KILTUMPER



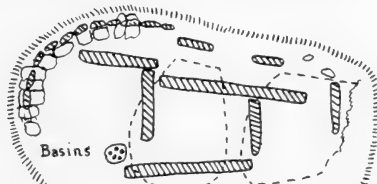
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CAHERMINANE

ISLANDS



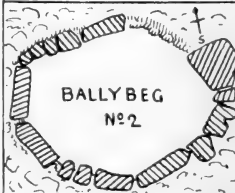
No. 3. CARNCREAGH



No. 44

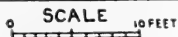
CAPPACHKENNEDY

Sheep-worship



BALLYBEG

No. 2

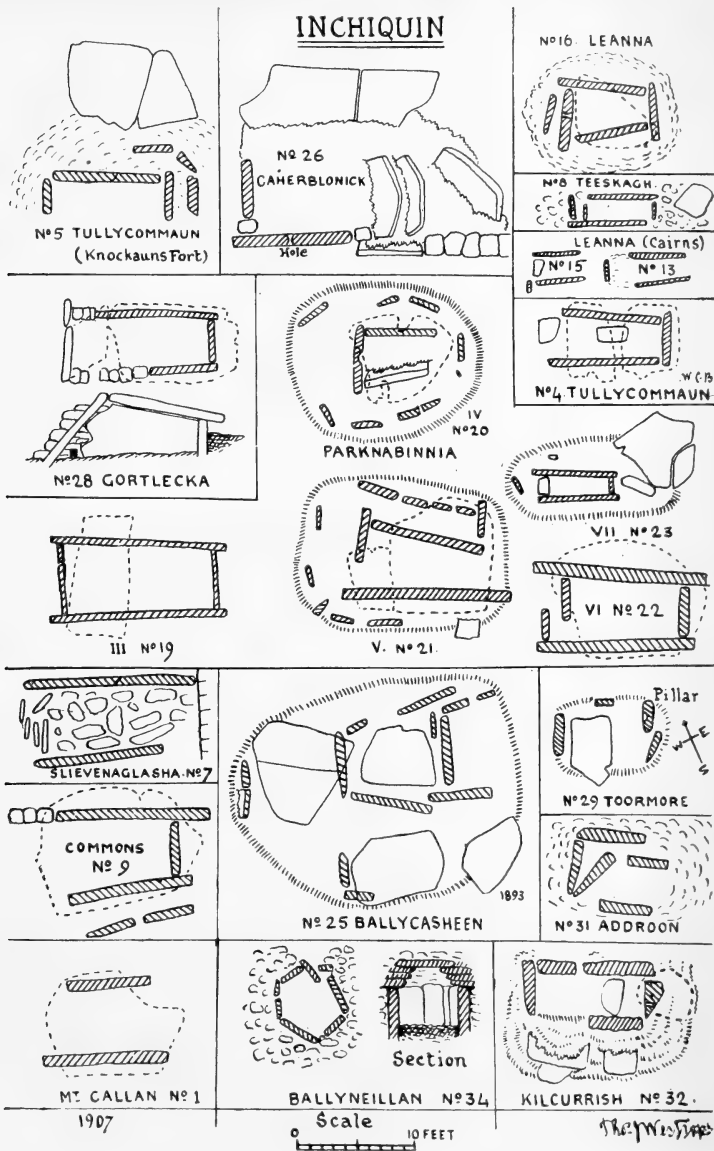


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WESTROPP--CISTS AND DOLMENS OF WESTERN CLARE.



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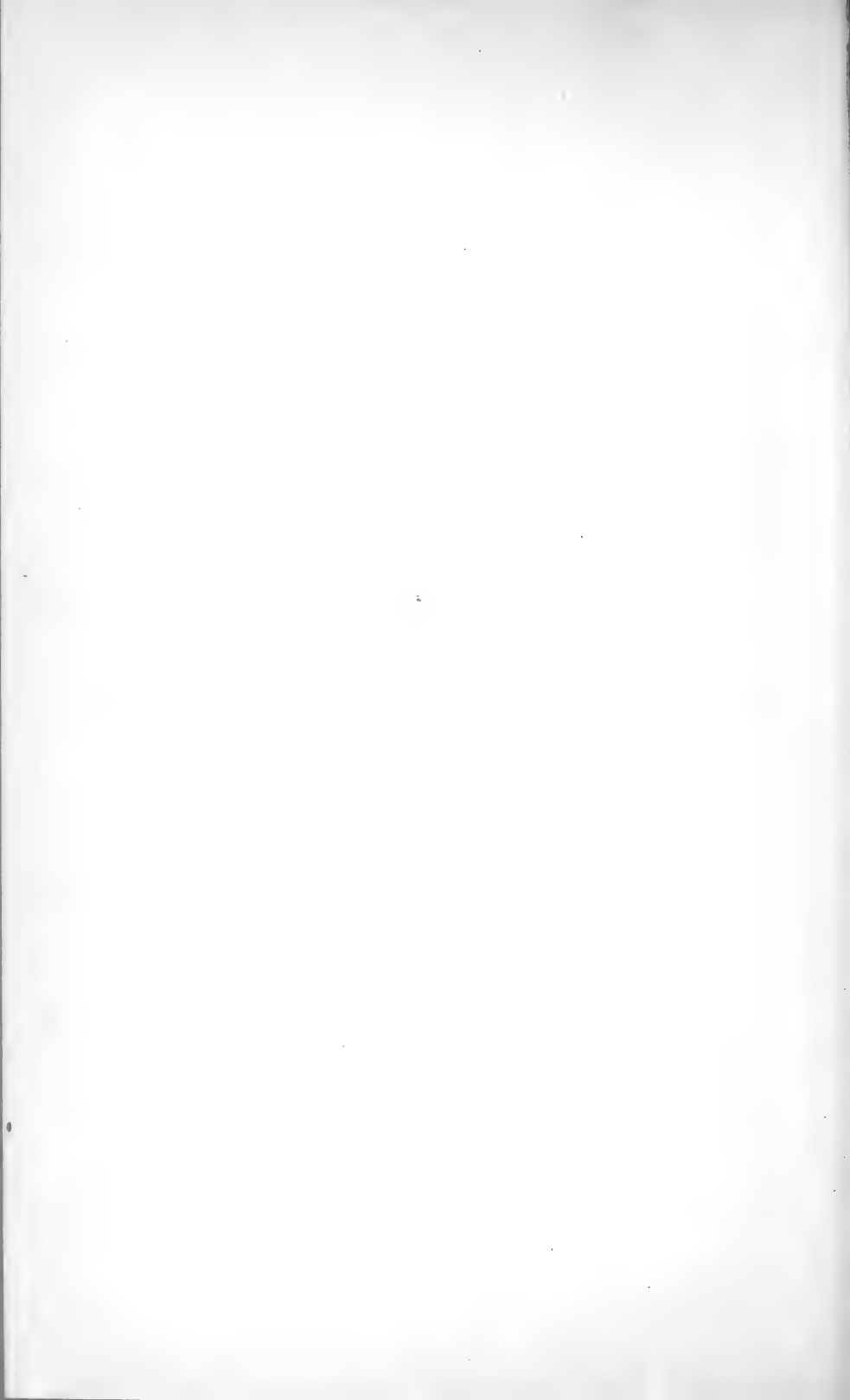
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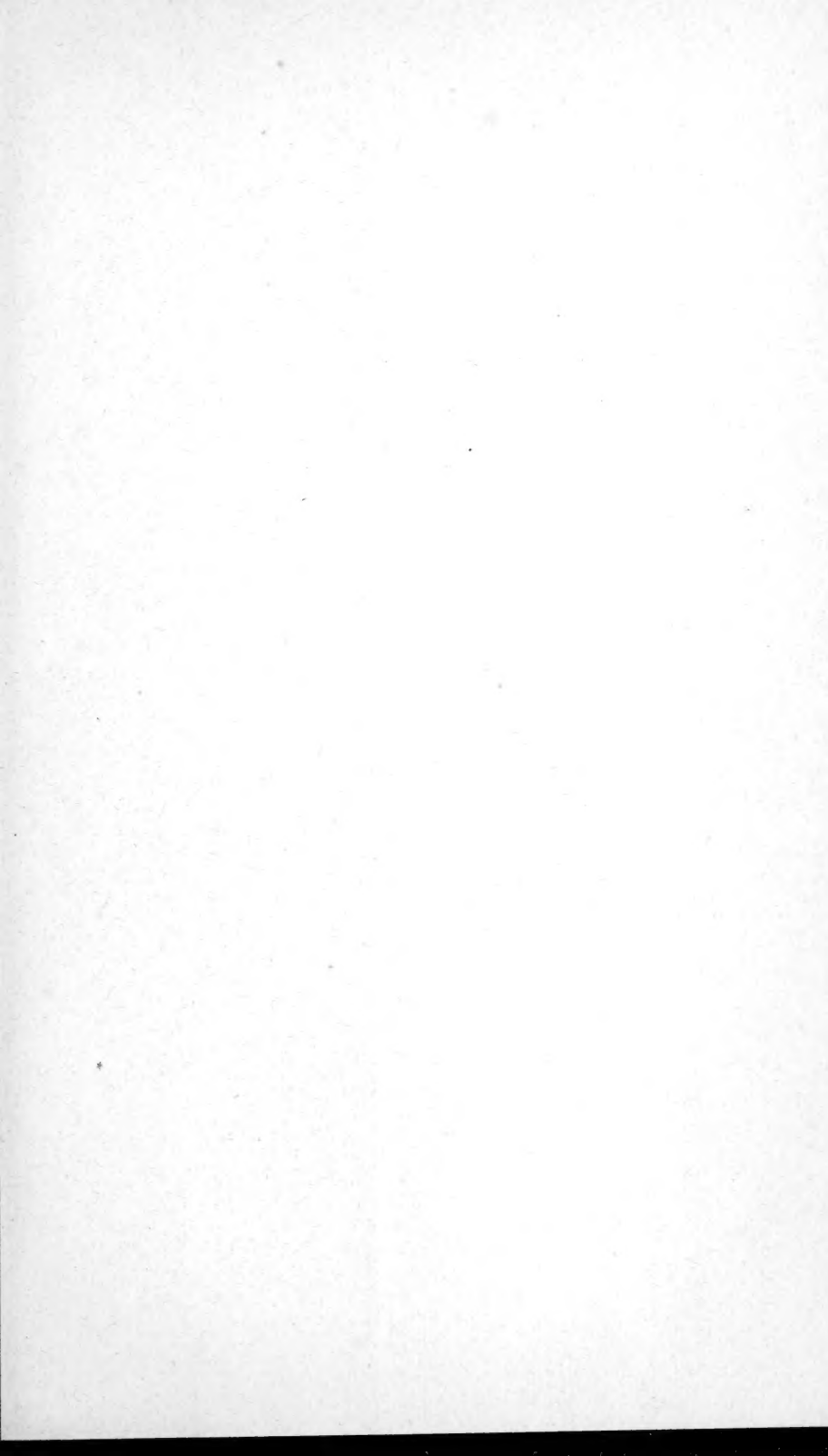
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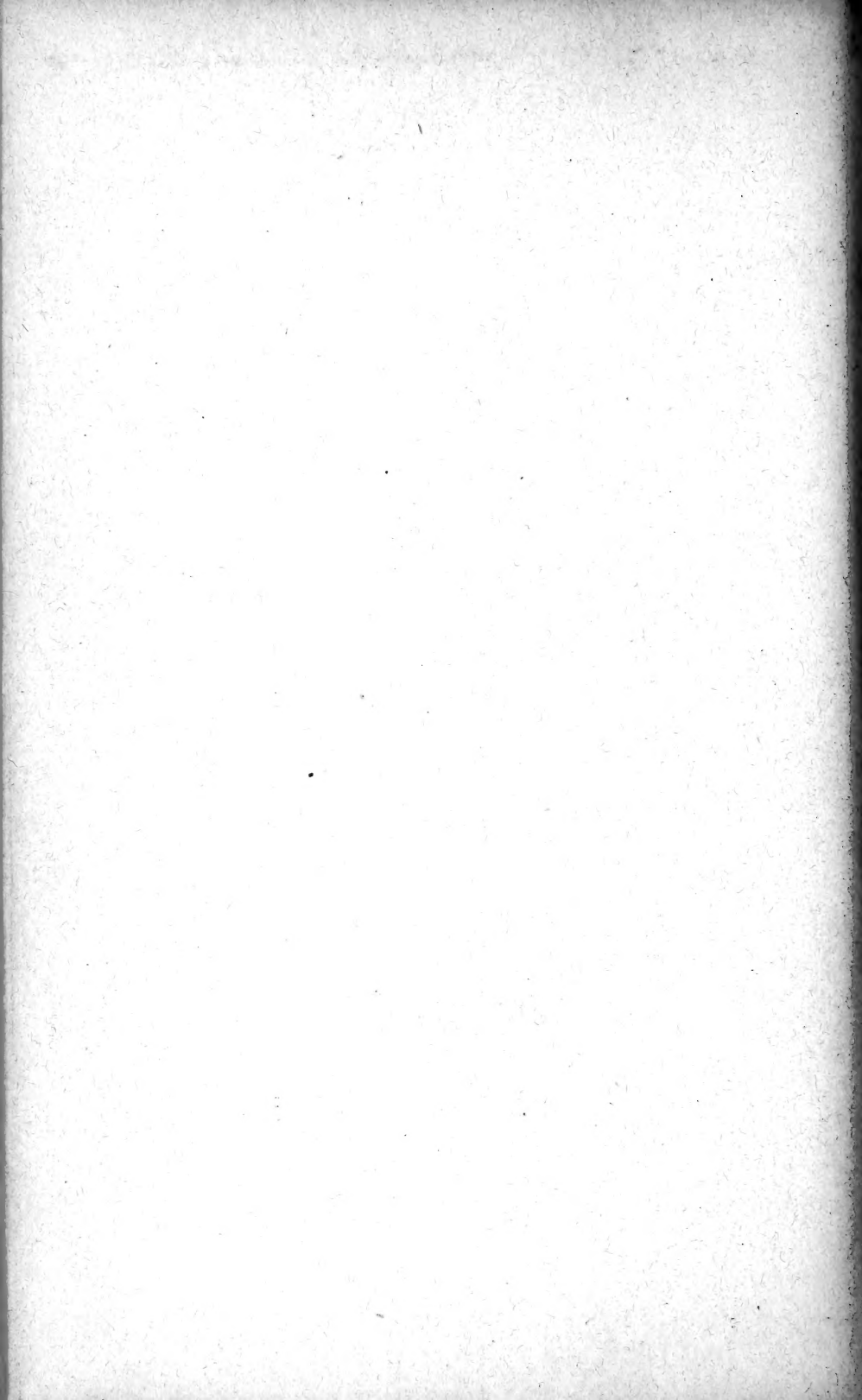
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