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LITERATURE

Introduction to the Study of the Foraminifera. By William B. Carpenter, M.D.; assisted by William K. Parker, Esq. and T. Rupert Jones, Esq. (Hardwicke.)

WATER, containing earth in solution or suspension, gives to the atoms of such earth a freedom of moving according to the impulse of the pervading polaric forces. These may be affected by the reaction of the earthy atoms themselves as aggregation proceeds; and both the course of motion and the resultant form of the crystal or other aggregate may be modified according to the nature of the fluid field of such aggregation. This fact has been lucidly demonstrated by Rainey's beautiful experiments on the artificial production of organic conditions of aggregation of carbonate of lime, inducing the same departure from crystalline shape as when the atoms aggregate in the vital production of shell and coral.

When the fluid is pure water the atoms of the earth are aggregated, under polaric guidance, into crystalline forms, distinct for each chemical kind of earth, and affording, by the angles and other properties of the crystal, characters of the "species" of the mineralogist. When the fluid is slimy, the operation of the polarizing force is modified, and apparently, though not really, impeded, and the character of a crystal is proportionally lost: the modification of, and departure from, angular or crystalline forms being greater as the slime is thicker; and especially when the atoms of such are in the condition, through condensation, to act and react upon the surrounding slime-suspending fluid, so as to attract or draw in outside atoms of slime, and to be attracted by or drawn out to such particles of assimilable slime.

The exuviations, ejections, and decay of organisms of all kinds and grades now supply to seas, lakes, rivers and other aggregates of water, the raw material for the re-commencement of those modes of action of the all-pervading force which are termed "vital."

This raw material abounds in, and indeed partly gives its character to, the kind of bed of sea or lake which is called ooze or "mud," the nature and varieties of which are manifold. At whatever depth of the ocean such "mud-bed" has been reached, the contained slime has been observed, when duly scrutinized, to be manifesting the vital form of force, and modifying the shapes in which the atoms of earth,—flinty or limy,—may be aggregated within the vitally acting slime.

The bulk of the present folio of 319 pages is devoted to the description, and its 22 plates and 47 woodcuts to the delineation, of the various leading forms in which the particles of carbonate of lime are aggregated and arranged within the portions of slimy matter, called, according to the prevalent character of their lime-aggregates, "Foraminifera." The organic basis or field of those aggregates has not been distinguished from that in which particles of silex may be precipitated, either in the form of fine needles, as in sponges, or of delicate cases, as in Polycystina; nor from that substance in which, probably from the want of the raw material in the fluid field of its existence, neither flint nor chalk is deposited, as *e.g.* in Actinophrys and Amœba; and such common organic basis has received the name of "sarcode" or rudimentary flesh, and of "protoplasm" as being that "in which every form of animal" (and plant?) "structure has its origin, and from which it is evolved by a process of gradual differentiation." Under the latter term the author defines this substance as being "composed of an albuminoid base, with oil particles in a state of very fine division diffused through it; it is tenacious, extensible and contractile; it is diaphanous, reflecting light more than water, but less than oil; and it is dissolved by alkalies, rendered transparent by acetic acid, and dyed brown by iodine. In the midst of this substance are usually to be seen *vacuoles*, or cavities containing a thinner fluid, which is often coloured; these are extremely variable, both in number and size, and their deficiency in any definite limiting walls is rendered obvious by their not unfrequent coalescence" (p. 13).

Under what modification or combination of the general polarizing force, the slime of mud or ooze is first condensed into a protoplasmic centre of such low vital force is still undetermined; but, once begun, and growing as such, it successively puts forth other portions or centres; and the "Foraminifera afford one of the best examples which the animal kingdom can present of that 'vegetative' or 'irrelative' repetition which is an essential feature of all low grades of organization." The primitive protoplasmic centre of a potential foraminifer, however, contains lime-water in much greater proportion than either of the substances defined by the author as composing it; it combines the calcium of such water with carbonic acid, and precipitates it on its exterior as a thin porous crust. The sarcode or protoplasmic matter can extend itself, like threads, from the pores of the crust or shell, and hence the name "foraminifer." It is an "organism" without organs; and manifests life at its lowest grade. Budding out a second protoplasmic centre, this forms a second calcareous porous case, which may or may not be detached from the first; most commonly it is not, and the manifold variety of the Foraminifera depends upon the direction of the budding-forth, and the shape of the buds or "sarcode" centres; whilst their beauty is mainly due to the repetition of the same structure on a regular plan. Some have a rectilinear, more have a curvilinear axis of growth; and the latter, being spiral, may be either flat, like the shell of the nautilus, or may coil round a lengthened axis, like that of a whelk. But between the rectilinear and curvilinear forms there is a complete gradation.

When the varying conditions of the ocean-beds, which are the seat of the foraminiferous mode of resumption of vital force, are considered,—either in regard to distance from the surface, decreasing from depths exceeding two miles, as reached by the soundings of the Atlantic Telegraph Company, and of 1,600 fathoms as plumbed by Wallich between Cape Farewell and the Island of Rockall, to the shallows of tidal shores,—or in respect of the constituents of the sands and muds in which the slime-elements become aggregated into protoplasmic centres,—corresponding modifications of the forms of deposit of carbonate of lime in and upon such centres might be expected,—are, indeed, inevitable under such low conditions of a centre of vital power, with corresponding weakness of resistance of surrounding influences. Accordingly, a result of the summary of the observed forms of foraminiferous shells in Dr. Carpenter's "Introduction" is, that a definition of a species is impossible, in the terms at least to which organisms with definite organs lend themselves; and that the like "ordinary method of definition" of the genus is "impracticable." Upwards of twenty pages are, nevertheless, devoted to the attempt to classify the zoologically unclassifiable Foraminifera. The efforts of the mineralogist towards a like systematic end are painful enough, and meet with as inadequate a reward; but the conditions of the aggregation of mineral atoms, under the guidance of polar force, in the purer fresh waters, are more definite and less varied than those in the complex solution which forms the ocean.

We have supplemented the author's definition of the protoplasmic base or seat of the chalk-precipitate by the quantity of "lime-water" which fills out the delicate, filmy, albuminous lime. Our meaning is this: every river pours a solution of lime into the sea; but pure water only evaporates from its surface. All sea-water, therefore, holds (with many other salts) a proportion of lime in solution; and if this caustic earth were not disposed of, the effect of evaporation would, in time, unfit the sea for the purposes or as a medium of life. Amongst the instruments by which the soluble caustic lime is precipitated in the condition of a mild, insoluble carbonate of lime, the Foraminifera are the most active and the most widely diffused. In the deep-sea soundings to which reference has been made "the surface layer of the ooze was formed of living shells; whilst its principal mass consisted of the exuviæ of preceding generations."

To Ehrenberg we are indebted for the capital discovery of the large proportion in which the shells of Foraminifera enter, either entire or comminuted, into the formation of chalk ('Ueber die Bildung der Kreidefelsen und der Kreidemergel durch unsichtbare Organismen,' in the *Transactions* of the Royal Academy of Berlin for 1838; and 'Ueber noch jetzt zalreich lebende Thierarten der Kreidelbildung und den Organismen der Polythalamien,' *Ibid.* 1839). When this constitution of the downs and more notable cliffs of Albion is duly examined, it is found to bear a close resemblance to that of the mud which has been dredged up from a great tract of the bed of the Atlantic, and which was composed of little else than the calcareous shells of Globigerinæ and other foraminiferous forms, with the silicious shields of the allied Polycystineæ.

If the finer part of a portion of chalk be washed away, the remaining sediment consists almost entirely of foraminiferous shells. They have also been found in similarly upheaved beds of older oceans, down to the Lower Silurian, in the instances of calcareous rocks of a consistency to be washed; and even in hard limestones and marbles foraminiferous shells can be detected, by the microscope, in polished sections and in thin slices laid upon glass.

Another kind of evidence of the share taken by the polythalamous Foraminifera in the formation of the earth's crust has been made known to us also by the original and persevering labours of the great micrographer of Berlin, in his discovery that their shells occasionally become infiltrated by a solution of silicate of iron, which fills by precipitation not only the chambers, but the pores and co-extended canals, even to their minutest ramifications; so that when a shell thus infiltrated undergoes decomposition, a perfect internal cast of the original protoplasm and its root-like extensions remains:—

"Of such casts it has been shown by Prof. Ehrenberg that the green-sands which present themselves in various geological formations, from the Silurian system upwards, are in great part composed; and his discovery has a two-fold value, as, on the one hand, it places before us far more exact representations of the configuration of the animal body, and of the connexions of its different parts, than we could obtain even from living specimens by dissolving away their shells with acid

(its several portions being disposed to heap themselves together in a mass when they lose the support of the calcareous skeleton), whilst it also enables us to identify with great certainty the types of Foraminifera by which these casts were originally formed, notwithstanding the entire destruction of the shells."

The meaning which the author attaches to the term "type" may be illustrated by his characters of the family of Lagenidæ. The shell "substance" is hyaline or vitreous, and very hard, perforated by tubes of extreme fineness. The "septal" aperture is small, circular and central, more or less prominent, sometimes produced into a siphon-like tube.

The generic name Lagena is retained for the Foraminifera which form a single-chambered shell, globose, with a prolonged neck and terminal aperture. But from such "typical" Lagenæ the deviations are numerous—*e. g.*, into an ovate form, pointed at the hinder end, or so narrowed as to become "fusiform," &c., or with introversion of the flask-shaped neck, which then gives occasion for another generic name—*e. g.*, Entosalenia, &c.

If the protoplasm, operating under the conditions which lead it to precipitate its chalk in the texture and form of Lagena, be so favourably placed in regard to the acquisition and assimilation of fresh slime as to bud out successive portions thereof, an elongated vitreous shell is formed of a series of segments joined end to end in a straight line, sometimes with progressive increase, giving the entire shell a conical form.—

"From the rectilineal Nodosaria, through the gently-curved Dentalina and the more strongly-curved Marginula, we are led, in a series so perfectly gradational as to forbid lines of demarcation from being anywhere drawn across it to the spiral Cristellaria, which may be regarded as the highest manifestation of the lagenoid type. From this central stem we find a set of offsets more or less divergent, presenting modifications of the typical characters on which generic distinctions have been founded, but which we cannot recognize as of higher than varietal importance."

Nevertheless—and, indeed, of necessity in respect to finite capacities of comprehending the manifold results of the conditions of creative force—the author proceeds to arrange about a "type form" a second group of genera, forming the family Globigerinida; and a third group around another "type" forming the family Nummulinida.

This latter includes the largest and most highly-developed kinds of Foraminifera, the existing members of which are almost exclusively confined to tropical or sub-tropical regions. Under analogous influences must have been produced those giants among Foraminifera which multiplied during that early tertiary period which has been called, after them, "nummulitic." Their shells form, literally, mountain masses, once in the depths of ocean, now upraised to the surface. The "nummulitic" limestones are mere aggregates of such organic products, the interspaces of the entire shells being occupied by smaller specimens of the same kinds or by fragments of the larger ones. These rocks occur in Southern Europe, Northern Africa, India, Jamaica. The "Great Pyramid" of Egypt is built of the stone formed of the kind of Foraminifer called *Nummulites nummularia*, from its resemblance to a coin.

The above-recited three "types" or "families" of Foraminifera are grouped together under the "sub-order" Perforata, the shell having the tubular apertures for the exit of the filaments of protoplasm called "pseudopodia." They may be regarded as the "typical" Foraminifera. All the kinds have calcareous shells, and are marine.

Aggregates of slime, snot, or "protoplasm," however, occur, which, putting forth their pseudopodial extensions at one point only of the surface, cover the rest with a case which is imperforate. In the Miliolida, which are and were marine, the shell is of porcellanous texture. In the Lituolida, some kinds of which live in shallow seas or brackish water, the shell is "arenaceous," or composed of foreign particles cemented together upon the outside of the protoplasm. In the Gromida, of which many inhabit fresh water, the shell is membranous or "chitinoid."

The freshwater Amœbidæ resemble the protoplasmal basis of the "perforate" Foraminifera; but the conditions for obtaining the lime are poor or absent in the sphere of their existence. The truly vital essential part of all these minute and beautiful organisms is alike. Since the great step which Dujardin ('Observations sur les Rhizopodes et les Infusoires,' *Comptes Rendus de l'Acad. des Sciences*, 1835) made in the right appreciation of their nature, observers have progressively concurred in interpreting the results of their scrutiny more or less in accordance with the following expressions of our author:—

"The physiologist has here a case in which those vital operations which he is accustomed to see carried on by an elaborate apparatus are performed without any special instruments whatever,—a little particle of apparently homogeneous jelly changing itself into a greater variety of forms than the fabled Proteus; laying hold of its food without members, swallowing it without a mouth, appropriating its nutritious material without absorbent vessels or a circulating system, moving from place to place without muscles, feeling (if it has any power to do so) without nerves, propagating itself without genital apparatus; and not only this, but in many instances forming shelly coverings of a symmetry and complexity not surpassed by those of any testaceous animals." (p. vii.)

The large experience of the Foraminifera which Dr. Carpenter has accumulated from his own studies, derivative and direct, and from those of his coadjutors in the present work, Messrs. Parker and Rupert Jones, has led him to the conclusion that—

"the ordinary notion of *species* as assemblages of individuals marked out from each other by definite characters that have been genetically transmitted from original prototypes similarly distinguished is quite inapplicable to this group. * * The only natural classification of the vast aggregate of diversified forms which this group contains, will be one which ranges them according to their direction and degree of divergence from a small number of principal family-types. * * The subordinate groupings of genera and species which may be adopted for the convenience of description and nomenclature, must be regarded merely as assemblages of forms characterized by the nature and degree of the modifications of the original type, which they may have respectively acquired in the course of genetic descent from a common ancestry. * * Even in regard to these family types, it may fairly be questioned whether analogical evidence does not rather favour the idea of their derivation from a common original than that of their primitive distinctness." (p. xi.)

We here discern the influence of Mr. Darwin's volume, 'On the Origin of Species,' on the mind of the writer, the essentially distinctive character of which work is the attribution of all animal species, as descendants "from at most only four or five progenitors, and plants from an equal or lesser number,"—the author adding:—"Analogy would lead me one step further, namely, to the belief that all animals and plants have descended from some one prototype." The resemblance is so close between the terms in which Dr. Carpenter repeats his main conclusion as to the origin of the acrite Foraminifera, and those in which Mr. Darwin expresses his conclusions in regard to the origin of all the living beings of this planet, that we are led to question whether a like influence may not have affected Dr. Carpenter's conclusions and expressions as to the nature of the species and genera of antecedent investigators and classifyers of the Foraminifera.

With regard to the highly interesting and instructive facts, of the identity of some (Ehrenberg determined it in ten) of the so regarded species of fossil Foraminifera of the chalk with still existing species, and of the identity of more of the Foraminiferous Nodosariæ of the Triassic, Permian and Carboniferous strata, with existing forms, Dr. Carpenter explains it, agreeably with the Darwinian hypothesis, as a case "of the genetic continuity between the Foraminifera of successive geological periods; graduating backward to the period when they began to descend from a common original," or, to use the Master's words, "from some one primordial form, into which life was first breathed." (*Darwin*, p. 484.)

According to this hypothesis we are compelled to conceive, or try to conceive, a period in our planet's history in which the conditions of life, or the circumstances tending to change the modes of operation of all-pervading force in the vital direction, were uniform, or at least that the uniformity which led to the impossibility of the existence of more than one "original form" had only been broken so far as to allow of the variation of such form into those of a few progenitors of succeeding classes of beings; the grade of differentiation of such progenitors from the primordial one being such as might be manifested by an Amœba or whatever Dr. Carpenter may conceive to have been the original "father of all Foraminifera."

The inevitable corollary of the Darwinian hypothesis seems to us to demonstrate its weakness; and to show by contrast the superiority of the Lamarckian principle of the heterogenous production of the primitive types of organisms. Agreeably with this principle, we conceive that "particles of apparently homogeneous jelly" are now, as of old, being aggregated through the operation of existing interchangeable modes of force, under special conditions, capable of causing, for example, the special characters of the Foraminifera.

The difference of atomic condition between a speck of jelly exercising the attraction of cohesion and one supplementing such attraction by the force of more intimate atomic union, call it incorporation or assimilation, may not be greater than the difference of atomic condition in a non-magnetic and a magnetic piece of iron: it is certainly very analogous to it. The latter draws to itself contiguous pieces of iron, which stick to the hard surface and cannot get in: the looser suspended atoms of the jelly-speck, under the assimilative or organic state of force, allow the attracted particles to permeate the mass, there to adhere atomically to their like, in short to be assimilated; the unassimilatable particles give way and are pushed out.

Every observer of the movements of such a sarcodal aggregate as Amœba, or Actinophrys, may recognize enough of the above-indicated correspondence with magnetic attraction and repulsion to place afresh before his judgment, for unbiassed consideration, the question whether such properties of the jelly-mass compel the invocation of a miraculous "inbreathing of life" for their initiation, and of generation exclusively for their continued display. Analogy of the phenomena of convertible modes of operation of polaric force leads us to conclude that the difference between snot and sarcode, between passive and active states of mucus, is due to a conversion of attractive or other mode of polar force

into the mode called "assimilative," "organic," or "vital." We believe, to use Darwin's common expression, that such conversion occurs under the conditions favouring it; that such conditions exist now as of old, and that they have operated in the production of Foraminifera in the ooze or mud of sea-beds from the Silurian period, or the remotest one for the possibility of such conditions of vivifying jelly-specks, to the present day.

Dr. Carpenter's studies of the porous chalk-deposits in and on these jelly-specks appear, however, to have induced him to adopt a different conclusion; to assign the beginning of such organism to an occult cause, to an operation of force or to a concurrence of forces which have now no place in Nature,—a creative force in fact, which Darwin could only express in Pentateuchal terms as the primordial form "into which life was first breathed"! Such primordial form of Foraminifera, once created, with its power of growing by assimilative atomic attraction and of propagating by pushing out and detaching particles of its substance, increased and multiplied. The foraminiferous offspring in time spread into positions and fell under conditions which, by reaction on the primordial organic properties, modified diversely the resultant conditions of the foraminiferous body and shell. The "Foraminifera of successive geological periods" have all descended from the first-created little particle of homogeneous jelly, having the properties above quoted from p. vii; they are related thereto by genetic continuity; in the author's words and type, they are "the *direct lineal descendants* of the Foraminifera of very ancient geological periods." The evidence of this astounding assumption he regards to be "as complete as the nature of the case admits," that is to say, as it possibly can be, or, in fewer words, to be demonstrated! Accordingly, we find writers who accept the dictum, and *in verba magistri* use the language of the Darwinian hypothesis, remarking, "not without astonishment, that scarcely any of the species of Foraminifera met with in the secondary strata have become extinct." "Nodosariæ of the trias have transmitted descendants without loss of any of their essentially specific features to the present day.' (*Phil. Trans.*, 1860, p. 582.)

Observation has, however, some value, though it may, or rather must, in natural objects, fall short of the extent and perfection of its subject. For example, the earliest or oldest strata with evidence of life present such evidence under a rather considerable variety of grades and conditions, agreeing, however, in a general way with the variety of states arising from different chemical constitutions of sedimentary rocks, from different depths in the sea, and other conditions likely to influence the state and form of the co-existing organisms of the period. The uniform condition of the surface of the earth at the period when the organic form of force was first capable of energizing upon such surface, which uniformity must be assumed at the period when the Darwinian primordial form of all organisms, and the Carpenterian primordial form of all Foraminifera existed in solitary state, is a condition of the earth's surface of which no geological observations whatever afford the slightest foundation or reason for assuming.

As, according to John Mill, the aim of the physical philosopher is to determine "what are the fewest and simplest assumptions, which being granted, the whole existing order of nature would result" ('Logic,' 3rd edit., vol. i., p. 327); so we hold, that the aim of the philosophic naturalist is to determine what are the assumptions having the best ground of acceptability from observation and analogy, on which organic forms and conditions, through known natural powers, might arise, propagating modifiable offspring concurrently with the continued operation of heterogenous productive force, which would people the globe, in the long course of its life-periods, with the various grades and forms constituting its present Fauna and Flora. We hold it to be contrary to the spirit of Mill, and of every searcher after truth, to prepose to the mind any quality of "number of primitive types," whether small or large, as a guiding idea in this high aim.

Reverting, then, to the question of the origin, or coming into existence, of a "particle of seemingly homogeneous jelly," with the powers above cited from p. vii. of the work under review: the assumption of an occult, miraculous, creative cause operating once for all, with the inevitable corollary of uniformity of vital conditions of existence during the hypothetical, uniform, primitive and primordial state of the earth's inhabitants, appears to us to be a less "simple assumption" than the following, viz., that at the period when life became possible on the earth's surface the conditions were sufficiently varied to permit the conversion of the general polaric into a special organic mode of force to operate under circumstances resulting in a variety of the simplest forms of life, such as "monad," "mucor," "amœba," "lichen-spore," &c., and that such conditions have continued to operate in the heterogenous production of "organisms without organs" to the present day.

The atoms, attracting and attracted, causing the pushing out and drawing in of the "sarcode," intus-suscepted at any part of the surface and assimilated, augment the mass, which buds out; in some the bud falls off, in others it coheres, and may form a polythalamous or dendritic whole. So in the crystalline salt, the atoms, attracted to the surface, cohere according to the law of its crystallization and form, sometimes as beautiful dendritic wholes, as in Infusoria, zoophytes and plants. In all these cases the single cell and the primitive crystal continue to be independently and "heterogenously" brought into being.

When observation shows that a particular form of Foraminifer occurs in fossiliferous rocks of all ascertained geological periods, we deduce from the fact that the conditions of the heterogenous creation of such form have been the same. Instead of concluding that the particular form or kind of Nodosaria of to-day is the great-great-&c.-grandchild of the Nodosaria of the carboniferous period, itself the lineal offspring of the occultly-created primordial Foraminifer, we deem it the "simpler" assumption, that the conditions of the "ooze" which led to the "fusiline" form Nodosaria coming into being when coal-plants flourished, operate in like manner in producing that particular form of shell-making jelly at the present day. In like manner we regard the valuable labours of Messrs. Parker and Rupert Jones 'On the Nomenclature of the Foraminifera' as a suggestive body of proof of the degree in which uniform conditions of the development of Foraminifera, characterized and named "specifically," have operated during long geological periods on this planet.

Agreeably with this "heterogenous" hypothesis is the great and significant fact of there having been "no advance in the foraminiferous type from the Palæozoic period to the present time." Most adverse is this fact to the hypothesis that one primordial form was first, and once for all, created, with a power of producing progeny susceptible of variation and improvement to the illimitable degree postulated by Darwin. It is expressly admitted by his disciple, the author of the work under notice, that "there is no indication of any tendency to elevation towards a higher type" in the foraminiferous Fauna of any period; but the significancy of this fact seems to be lost on Dr. Carpenter in reference to the most important, indeed supreme, deduction from the numerous particulars which he has ably and instructively set forth in his 'Introduction to the Study of the Foraminifera.'

In regard to the history of these most interesting and beautiful, though for the most part minute, forms of Protozoa, the salient features which, in zoology, will be remembered gratefully and with admiration of the originality, acuteness and perseverance of the observers, are—the determination of the true nature of the Foraminifera and their kinship to Amœba and other freshwater rhizopods by Dujardin,—and the discovery of their antiquity and important share in forming the earth's crust by Ehrenberg.

To the general reader there is no work on the Foraminifera which will prove more instructive and satisfactory than the richly-illustrated volume which Dr. Carpenter has brought out, with the aid of Messrs. Parker and Rupert Jones, under the auspices of the Ray Society. To the scientific reader, especially looking to the bearing of the recorded facts and observations on the generalizations of highest interest at the present phase of his science, the result, we regret to state, is such as the author himself seems to recognize when, with becoming modesty, he confesses that "he cannot venture to anticipate that his work will prove altogether satisfactory."

Live It Down: a Story of the Light Lands. By J. C. Jeaffreson. 3 vols. (Hurst & Blackett.)

THE title of this work is in itself a novel, and suggests half-a-dozen stories at once. The story that Mr. Jeaffreson has selected will, however, satisfy most readers; it is full, well considered, and well worked out. The interest is solid, and depends more on the delineation of inner life and character than on the accidents of a critical moment. The plot is broad, and the interest goes on increasing to the last page. The story is extremely well constructed; it is by far the best work of fiction Mr. Jeaffreson has yet written, and in great measure realizes the promise of excellence given in his former novels.

The story turns on the traditional "skeleton" said to haunt everybody's closet, and Mr. Jeaffreson gives his notion as to the best way of dealing with it. Everybody has some secret that he would not willingly impart to the world; and an authentic history of somebody else's "skeleton" has an attraction for every reader.

Mr. Jeaffreson's maxim for all secret sorrows is—"to live them down." There are different fashions of living things down: to keep any action or event absolutely secret is a wild hope—"*tôt ou tard tout se sait*," wrote Madame de Maintenon. Bluebeard's key was but the type of human experience. Scour out an event so that you destroy all traces of it in one place, and it breaks out visibly in another. All the characters in Mr. Jeaffreson's story have their own Secret, and they act and re-act on each other partly in blindness and partly from design. An old family, in a county town in "the light lands of Suffolk," hold themselves in retirement and dignified seclusion—their neighbours set it down to pride: alas! they have a wretched secret to live down. The old squire and the gentle, almost perfect woman, his daughter Adelaide, live together in the old manor-house, with the youth who is said to be the son of