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The Origin and Development of Scientific and Professional Societies, with their bearing upon the Institute of Actuaries and its associated Profession. A Presidential Address delivered before the Institute of Actuaries on the 29th of November 1897, *by* T. E. YOUNG, B.A., PRESIDENT.

I.—INTRODUCTORY.

IN adventuring upon a Second Presidential Address, the energy of hope and freshness which stimulated me in the former effort have vanished into trepidation of feeling. For I am unhappily conscious that I then exhausted any meagre resources I possessed of novel presentation of thought and research, and was reduced to virtual bankruptcy of serviceable suggestiveness which the interval of time has failed to annul.

I fear, moreover, to fancy that, violating the judicious attempt of recent years towards rendering this Address purely inaugural and introductory to Office, a righteous Nemesis may pursue me in the memories of future occupants of the Chair with the brand of retrogression and the imposition of needless burdens upon a post sufficently endowed with honourable toil.

Notwithstanding these deterrent influences, I am emboldened to adopt my present design by an ardent desire to express, in a Valedictory discourse, some reflections upon the direction of the future development of the Institute, and particularly to unfold certain observations, which have long weighed upon my mind, affecting the appropriate education of our Students. A final motive, I confess, was supplied by the wish,—if I may daringly introduce the classical allusion,—

to complete a Trilogy of Addresses upon a subject so rich in scientific analogies and philosophic relations as our Professional work, when conceived under the universal generalisations of the Doctrine of Evolution. In an earlier Paper, I endeavoured to present the varied aspects of the commercial Business of Assurance in the revealing light of this teaching, and to exhibit its systematised congruence with the principles of that Scheme; in the Address last year, I attempted a parallel course relative to the Scientific practices and methods on which this Business is based; and, in my present essay, I purpose pursuing a similar design in briefly expounding the Origin and Development of Scientific and Professional Societies, with their bearing upon the Institute of Actuaries and its associated Profession.

For these manifold reasons,—individually, perhaps, inadequate, but, in totality, impressive to my mind,—I am confident you will indulgently forgive another trespass upon your time and thought.

II.—SCIENCE AND THE ARTS; AND THEIR ORDER OF DEVELOPMENT.

In discussing this subject, the signal distinction between a Science and a Profession, with the correlative demarcation existing between a Scientific Society and a Professional Body, demand preliminary consideration with a view to clearness and coherence of apprehension of their relevant structure and history.

I need hardly pause to mention that the primitive practical Arts of life constitute the rudimentary elements from which the Professions are ultimately organised under social and scientific agencies; and hence, in tracing the development of the Scientific and Practical forms of observation and application, we notice that the latter mode originates in unconnected and rudely experimental efforts which finally emerge in the more or less finished shape of the several segregated Professions,—either loosely allied with Scientific conceptions and methods or, in the higher Professions, distinctly animated and directed under their control.

It might, *a priori*, be conjectured, both from psychological and social considerations, that the Profession (or, to speak more precisely at this point, the Arts or Elementary rudiments and stages of its completed form) would chronologically precede the Science,—the practical and plastic Art embodying at first crude and simple scientific notions, vaguely and imperfectly grasped, so to speak, by connate common sense, without the remotest attempt

at precision of knowledge or even conception; acquiring gradually a nicer and more adjusted character with the general advance of Science and its diffused knowledge; until, ultimately, in the Professions (consolidated from the isolated Arts) we perceive, in greater or less degree, the organised result where Practice is associated with Science in the most intimate sympathy and union.

And this chronological priority of the Arts is the teaching of universal History.

It used frequently to be assumed* that the primitive knowledge of Mechanics, for example, incarnated in the massive architectural monuments of Antiquity, implied a vast scheme of Science which must have existed in those periods to guide the worker's brain and hand, but which had now become irrevocably lost. Deeper investigation, however, has disproved the plausibility of this suggestion; and even at the present day many Arts are flourishing without the accompaniment of the Scientific principles on which theoretically they depend. The aphorism remains valid that the Principles which Art involves, Science subsequently evolves,*—the elementary principles of the latter being held in solution in the Arts without distinct separation; while, in the Sciences themselves, these principles are explicitly presented as a co-ordinated system of mathematical and physical propositions. As a specific illustration in Science, I may point to the genesis of Geometry from rude practical measurements of the Earth where the words, γῆ and μέτρον, form a compressed and vivid picture of this historical sequence.

Besides being chronologically anterior to Science, the Arts (or primitive contents of the Professions) are further differentiated from the Sciences by the circumstance that, while the former contain as a nucleus the simplest scientific truths in an incoherent and undeveloped state,—latent, it is true, in the execution of work but void of any enunciated form,—the Sciences consist essentially of a systematic series of generalised propositions, enlarging with the specialisation of intellect and the growth of preciser acquaintance with Nature.

And in subsequent stages, as I have indicated, the Arts acquire an exacter character with each conscious absorption of scientific principles into the machinery of their service as Professions.

Moreover, the object of the two provinces of Knowledge,—investigative and executive,—is essentially distinct. The essence of the Arts, and of the Professions in which they culminate, consists

* Whewell: Novum Organon Renovatum: cap. viii.

in direct applications to the affairs of life, while Science is a pure correlated scheme of general truths which possesses no necessary connexion, so far as the nature of the Science is concerned, with the requirements of technical work. A Science is self-contained and rests satisfied with its discoveries and their subsumption under Laws. Astronomy determines the uniformities of relation between Celestial Masses and the oscillations of the Tides, and, with enunciation of this dependency and its order in universal Time and Space (under prevailing conditions), the boundary of her domain is touched: it is the Art of Navigation (existing prior in crudely empirical form) that receives the intellectual bequest and transmutes the mental wealth into material results. So that the relation between a Science and the Arts (or, rather, of the Professions as their developed expression) may be generally defined as the accurate ascertainment and exact measurement, on the one hand, of the connexions between phenomena, concurrent and sequential, and the approximate application, on the other hand, to social and physical phenomena of the scientific truths already registered. The one is the Power; the other, the Instrument or train of mechanism which is adapted to production of practical effects.

Moreover, as a final note of distinction, a Profession, as an organised system of Arts, is distinguished from a Science by the vital accompaniment of a Teaching function. "To know" is the characteristic motto of the one; "To do" is the legend emblazoned upon the heraldry of the other: "knowledge",—of advancing precision and simplicity of form,—is the quest of Science; "works" expound the sphere and aim of Professional life.

III.—The Genesis of a Scientific and Professional Class.

The origin of the Scientific and Professional Character, or, to speak more in harmony with our Subject, the genesis of the Segregation of a *Class* or Classes as the possessors and promoters of Scientific and Professional knowledge demands a passing notice.

Mr. Herbert Spencer* has adduced a multiplicity of examples in evidence of the contention that, during uncivilised eras, the medicine-man, and, in the primitively civilised periods, the priest, naturally became the Depositary of Scientific truth and

* Principles of Sociology: Vol. III: cap. vi.

Professional application. Omitting the metaphysical and theological implications, the Ecclesiastic, besides alone possessing, in those uncultivated and troubled ages, the leisure competent for investigation and thought, was impelled to study physical phenomena in order to confirm his imputed dominion over Nature, as an objective support to his specialised functions. He secured the position of the supreme Man of Science; and, of his Professional superiority also, an illustration is furnished by the fact that the construction and custody of Bridges in Greece and Rome were exclusively associated with the Ecclesiastical Body. Mommsen has shown that the building of bridges, which were closely connected with the Temples, was relegated to the Sacred Colleges of Augurs and Pontifices; and that, in consequence of this assigned work or Profession, the Priests were termed "Pontifices", or "Bridge-builders", as the etymology of the word expresses. Milton, you will remember, with his refined and scholarly instinct in the employment of terms, uses the word in its original sense in the 10th Book of "Paradise Lost."*

From this combination of Scientific and Professional knowledge and activities in a single Class, a natural heterogeneity succeeded under the stress of wider and minuter learning, beyond the compass of individual mastery; the more detailed and exacting requirements of evolving Civilisation and the consequent complexities of Social relations; so that, in obedience to the enforced division of function and labour, the Man of Science and the Professional Man constituted, in time, two separate classes; while, at later stages, to which I now proceed, these Departments again assumed the more segregated forms of men devoted to individual Sciences and men attending to specific Professional pursuits.

IV.—The Genesis, and Conditions of Formation, of Scientific Societies and Professional Bodies: Integration.

We thus naturally and necessarily arrive from the Individual to the Collective stage, where the isolated units tend to combine and cohere into definite Associations of similar structure and function. Throughout the Organic and Inorganic Series of Nature, this Aggregation, or, as Mr. Spencer terms it, this process of Integration, is universally manifest; and as similarity, —if not, indeed, identity,—of Law also pervades and unifies human relationships, we find that individuals, attracted by

* Line 313.

corresponding character and impulses, conjoin into sympathetic associations under the genial compulsion of various influences, which I shall briefly describe, for the special cultivation of diverse domains of knowledge and the execution of distinct duties which the development of Corporate life compels.

Noting, therefore, as we proceed, the striking and interesting analogy of movement and order between the modes of combination in the material universe and the social sphere, we observe that the prime factor in the coalescence of individuals into Scientific and Professional Institutions consists in accordance of intellectual structure, and of specialised pursuit. But, besides this initial force and the mutual sympathy which it implies, confirming the tendency to union, various facts and conditions contribute a necessary impetus.

The individual element, however, again appears; for, as a matter of history, the formation of Scientific Societies has been simply the expansion of informal and private meetings of a few gifted men drawn together by the charm of a common purpose; recognising the need, with a view to effective energy, of united action and mutual stimulus; and animated with the larger aims, possible of realisation only by associated labour, which the widening sphere of knowledge and the intenser glow of intellectual light had awakened into hope. Intimately connected with these impulses, and indeed a primary condition of their practical exercise, has been the advent, after troubled eras, of National and Social freedom and peace which alone sustain the prospect of uninterrupted search and provide the serene atmosphere and continuous leisure on which Scientific prosperity depends.

Thus the earliest Society for the cultivation of Physical Science—the Academia Secretorum Naturæ,—was founded in Naples, in 1560, by Baptista Porta, as the consolidation of private gatherings of Scientific friends. Our Royal Society developed,—not as an instantaneous creation, but—as the social and genial enlargement of domestic conferences of cultivated men held prior to 1660,—comprising Dr. John Wilkins, Sir Wm. Petty, Dr. Willis, the Hon. Robert Boyle, and Mr. Christopher Wren,—who, attracted towards a fixed centre, sought to merge their isolated efforts in the promotion of method and research; labourers in different plots of the Intellectual Kingdom uniting their scattered holdings to form a more spacious and connected domain.

The origin of the Royal Academy of Sciences in France is ultimately traceable to informal assemblies in 1629, of scientific

colleagues for corporate concentration of energy, and among these early names we find a galaxy of wonder in themselves,—Descartes, Gassendi, Pascal, and Roberval. And although the Imperial Academy of St. Petersburg was originated under the autocracy of Peter the First, and established by the fiat of Catherine the First in 1725, while the Royal Academy of Science and Belles Lettres of Berlin was created in 1700, by Frederick the First, still the former was instituted on the advice of individuals,—Christian Wolff and Leibniz,—and the latter was really guided in its origin by the counsel of Leibniz. These two Societies, therefore, and their Continental successors, may thus be fairly asserted to exemplify the same primitive method of origin: the spontaneous aggregation of individual workers constituting the nucleus of the associated splendour. In similar fashion, our own Institute commenced in the private meetings of professional friends who, abandoning, under the spell of a common pursuit, all independent action and unconnected research, gathered themselves into the unity of a Scientific Commonwealth whose generous expansion involves the history and tradition which inspire the hopeful vigour of our Corporate life to-day.

It will be found also to be the testimony of History that those Institutions, Scientific and Professional, have presented the most valid title to permanent solidity and renown which, once formed, have not instantly developed in complete equipment, but have proved the secure result of tentative and graduated effort,—secure by reason of apparent insecurity. The organism in Nature gains its exquisite adjustment with external conditions by successive adaptations attended with varying sufficiency and frequent check. The Accademia del Cimento* (Academy of Experiment), established at Florence in 1657, with its noble watchword of investigation unfettered by preconception or dogmatic authority, was preceded, as an exemplar, by the Academia Secretorum Naturæ whose brief period of service was extinguished by Ecclesiastical tyranny; and, in precedence and prediction of the stability of our Royal Society,—presenting a tentative type of conception to the mind and thus presuggesting possible difficulties and their solution,—we find the scheme of the Invisible College delineated by Boyle in 1646; the ideal Philosophic-Mathematic College, described by Evelyn in 1659; and the fabled New Atlantis of Lord Bacon washed and circled by the Southern Seas. The early and, indeed, the long-continued troubled fortunes of the Royal Society display an impressive and

* White: History of the Warfare of Science with Theology: Vol. I: cap. xii.

often pathetic lesson of the conquered hindrances that finally built up an unassailable Source of Power.* So chronologically was the Institute of Actuaries preceded by informal meetings of Actuaries which commenced prior to 1836 and consolidated into the Actuaries' Club in 1848. Experimental searches after an ultimate ideal involve the moral and mental discipline, born of failure and temporarily shattered hopes, and produce definiteness of structure and coherence of organisation; swiftness of resource; practised skill in devising appropriate mechanism; confidence derived from conquered defeats; confirmed hopefulness in final issues; and the gift of adaptation to changing circumstances,—qualities and powers which constitute the basis of triumphant and permanent Force.

I have referred, as an essential condition precedent to the foundation of Scientific Societies, to the secure establishment of political and civil order. A few illustrations will suffice. The decay of Athens as a political power ensued as a result of the Peloponnesian War, but the political descent was synchronous with the ascending glory of her Philosophical, Scientific, and Literary life, and the founding of Plato's Academy in B.C. 389 marked the advent of a period propitious, through civil peace, to intellectual advance. The calm succeeding the Civil Wars which ended in the restoration of the Stuarts formed the tranquil season which nurtured our Royal Society in its vigorous growth; and the famous Revival of Learning itself crowned the era immediately sequent to the final fall of the Byzantine Empire and the termination of the Middle Ages.

Other conditions on which the fortunes and progress of Societies are dependent may be roughly described as General and Special. The predominant intellectual and æsthetic character of the Greek, favoured by his National isolation after the Peloponnesian War, then found an unimpeded expression, as I have stated, in the creation of Philosophical Bodies; but the specific character of the Roman mind, expressing itself in external in place of internal activity, proved inimical to movement in a similar direction. No Academy can be traced in the Roman Empire; not merely in consequence of the National aptitude with its tendency to material aggrandisement and devotion to martial ascendency, alien from that introspection and culture which are native to intellectual progress, but also by reason of the distracting turmoil of war and social complications forming effective barriers to combined mental adventure. In addition to

* Weld: History of the Royal Society: Vol. I.

the hindrances thus interposed by national characteristics and their material embodiment, the successive forms of Roman government,—and this political element possesses significant influence throughout the entire history of Scientific Societies,—furnished varying opposition to a quest which largely rests its sure foundation in consolidated political order. For while the Roman Republic despised the extension of learning as inconsonant with its own grosser structure,—the ornamental as compared with the useful,—the Empire, with equal though dissimilar animus, dreaded the enterprise of Arts and Letters as a possible precursor of political revolution, since freedom created by dedication to learning and Science extends with resistless energy into every channel of social life and thought.

It is of passing interest, in illustration of the effect upon Science and Literature of Local Character, to point out that, in France, the Academy first established in 1635 was devoted to preservation of the purity of the national language, as we might indeed infer from the literary grace and fluent pliancy of its speech. In England, on the other hand, the Royal Society expressed the practical characteristics of the Nation by specifically attending, in its earlier history, to questions of scientific application to the needs of life and commerce,—the construction of lightning-conductors for Cathedrals and war-vessels, for example, the ventilation of gaols, and the modes of obviating the corrosion of the copper sheathing of ships.* And this practically adaptive bent is especially manifest in the minuter ramifications of our varied Professional work in this Country. Although, to employ the language of the Schools, we can trace, in affiliation, the *Form* of the early tendency in Greece in its modern representatives, the *Matter* of the form has widely changed: the congregation of disciples for submissive reception of a Master's doctrines, or discussion of the tenets of a Philosophical Sect, is transformed into a varied Commonwealth, fused into unison by the same Spirit, but with open and responsive minds compacting facts into natural systems instead of superposing preconceptions upon facts.

But although the form of Society created in Greece failed to become naturalised in the Roman Empire, the characteristic spirit of that Empire, void though it was of instinctive attraction towards Scientific union, descended in diverse expression into the later Italian mind, and exalted that Kingdom as the illustrious originator of all modern Scientific Institutions. It has always appeared to me an interesting example of Evolution that the local

* Weld: History of the Royal Society: Vol. II.

type of established political order; of rigorous discipline in unified action; of systematised law; exhibited in the ancient Roman world in territorial acquisition and legal organisation, reappeared in Italy, at the prophetic Renaissance, in the transfigured form of intellectual conquest, and of discipline applied to the domain of physical and mental phenomena of Nature. This Revival originated in ardent and inappeasable longing for the vitality and creative power of Classical Literature and Art. The material ideal became subordinate to the immaterial: the sword and phalanx succumbed to the chisel and the pen; the legal instincts were incarnated in Scientific formulæ and rules; and the mind discovered its legitimate birthright and heritage in higher themes and finer impulses than those which found their circumscription within unintellectual bounds.

The Intellectual Palingenesis of the cultivated and formative Races—the races endowed with a distinctive mission for the enlightenment of the World,—dawned in Italy, prior to the 15th Century, as a serene and humanistic sequel to prolonged social and mental darkness into which Roman Civilisation had vanished, and over which ecclesiastical despotism had disastrously reigned. Dowered with gifts of Classic Literature by Grecian refugees, and fired by the native strains of Dante, Petrarch, and Boccaccio, the Renaissance heralded, in lucent and broadening outline, the ample and propitious advent of an intellectual and memorable day.*

The circumstances precedent and preparatory to that condition which is consonant with mental freedom and spontaneous absorption in Science and Art, comprise also the absence or impotence of Ecclesiastical tyranny which, in the anterior stages of Science, had lavished its energies in barbaric efforts to stem the advance of intellectual and moral liberty which, in its gross and perverted interpretation, signified merely the freedom of compelled and abject submission. In Galton's finely suggestive work on Hereditary Genius,† a graphic and realistic picture is painted of the saddening and far-reaching consequences of this organised oppression upon the finer development of the Race by seclusion of the gentler types of character and repression of the types of originating and enterprising force. The Revival involved, again, the possession of sufficiency of insight into the marvels and complexities of Nature to cherish the hope of keener and more assured vision; the fusion of genial feeling and the formative

* Cajori: History of Mathematics: page 138.

† Chapter on the Influences that affect the Natural Ability of Nations.
[*Vide* also Lecky's History of Rationalism in Europe: Vol. I: cap. iii.]

force of mental collision between the toilers in a common Scientific pursuit, so refined from the selfish meagreness of individual effort and personal repute as to rank supreme the attainment of the general weal: the helpful equilibrium of National peace and rigid order, without which the calm concentration of intellectual energy languishes and dies; and the single love of Truth as symbolised in the Earth and Skies and Human Relationships awaiting but the deciphering power for its perfect interpretation.

Sequent to the Accademia del Cimento, multitudes of Associations originated from time to time in Italy, flushed with the renovated ardour of intellectual dominion over the phenomena of Nature and of unimpeded access to æsthetic life. The spirit of this impetuous Reformation—the coronation of Thought and Feeling upon the field where mental emancipation had been wrested from priestly bigotry,—swept slowly into England and then diffused its influence into France. It is pardonable to remember that the Royal Society formed the primary and most famous embodiment of this reinvigorated impulse if on no larger ground,—and could a more memorable claim be advanced?—than the issue of the Principia. For it has been justly suggested on evidence that, owing to Newton's deep aversion from publication with its possible controversies, the Principia, in all probability, would have remained unfinished and unknown had not this Society acted as the medium of that unsurpassed and unsurpassable flight of genius. The light of the Sun would be invisible were no conveying Ether to exist.

The descriptive form which Scientific Societies assumed has variously been expressed in the generic terms of Academy, Institute, and Society. These Titles no doubt once possessed distinctive shades of meaning based upon their etymologies, but, with the synonymising tendency of language, the signs of demarcation have definitely disappeared, and no useful purpose would be served beyond one of purely archæological interest in attempting to ascertain the original definitions. It is historically curious, however, to observe that the designation of "Academy" has been usually retained on the Continent; the name of "Institute" was employed in France; while British usage has consecrated to scientific service the title of "Society."

The term "Academy",—whether derived from Greek words signifying "medicine" and "people",* or, in another form of the phrase, "remoteness from the people",† or, as tradition

* ἄκος; δῆμος. † ἑκὰς; δῆμος.

imputes, enshrining the name of the reputed owner* of the property,—was first applied to the historic school of Plato which assembled in the grove contiguous to Athens. And in loyal perpetuation of a title so illustriously allied with a creative mind, the various Associations, devoted to the culture of Arts and Philosophy, which ultimately were founded in Greece,—rare in number but rare also in a higher sense in intellectual stimulus and fruitful ancestry,—were designated by the name. The symbol was transmitted to the Learned and Scientific Institutions which luxuriantly flourished in Italy and other continental countries; and I understand that, to the present day, the word "Academy" in the European languages, except in English, is restricted to a Central organ of sound information and correct taste in intellectual subjects.

So far as I can discover, one of the earliest uses of the term "Institute" occurred in France. When the aristocracy of talent was engulphed, with the aristocracy of wealth and rank, in the French Revolution, a decree, passed by the Republican Convention in the year III of the New Calendar, suppressed, in 1793, the existing Academy of Sciences, and ordained that an "Institut National" should be established in its place. It would appear that, like all profound and frequently unreasoning social upheavals,—unreasoning, I mean, in the extreme measures by which they are accompanied,—the French designed, by the cancelment of this ancient and honoured name, to sever their modern history from the natural and inevitable links of tradition, just as we observe in the English Reformation a corresponding and retrogressive policy in the introduction of our barbarous pronunciation of Latin as part of the abrogation of the Past which had cultivated the Italian mode.

In England, the term "Society" seems from the outset to have grown naturalised as distinguishing communions of congenial minds for the prosecution of scientific method and research.

V.—The Differentiation of Scientific Societies; and Reintegration.

I have thus traced the process of integration or union of individuals into the form of Scientific Societies, which possesses its analogue in the Organic and Inorganic kingdoms in the production of a composite organism with extended and minuter

* Academus or Ecademus.

relations to exterior agencies and a resulting mode of completer existence. But similar to the corresponding order in the region of Nature, the action of incessant influences gradually effects a differentiation of the homogeneous Body, and a separation of parts ensues as a fresh development of life and activity. In a complex organism surrounded by increasingly complex conditions, a sequent specialisation of function to different departments of its Corporate Being inevitably inaugurates the commencing stages of an orderly process which fractures the attained unity into diversity, though each section is still mutually co-operant, and contributes, in due and essential proportion, to the integrity and equipment of the Whole. In the intellectual and scientific region, these influences comprise the unfolding variety of Nature; and the multiform requirements of the Social Body, developed by the progress of Civilisation and the interactions of Commercial and Industrial interests. Confronting these imperious and determinate demands with the comparatively stationary range of the human Intellect, the approach of the period is proclaimed when the totality of labour must be segregated into distinct divisions. The Scientific unit, dealing hitherto with the entire domain of Science, becomes necessarily partitioned into sections, restricted to individuated provinces of knowledge, while the Professions in turn assume more minutely distinctive functions, exclusively concerned with limited forms of practical application, and concurrently become endowed with a finer Scientific finish and capacity as the principles and methods of particular Sciences,—more efficiently promoted by their own divisions,—receive a detailed pliancy and possess a more manageable and executive shape.

But I need not burden you by describing the modes in which this allotment of service has naturally occurred by the detachment of Societies from the original Body, and by the wider ramifications of Professional work. I will simply adduce an illustration gathered from the experience of our Royal Society. In 1807, the Geological Society, and, in 1820, the Astronomical Society, were founded by Fellows of the Royal Society under the compelling stress of the deeper disclosures of Nature and their imperative appeal for specialised Intellect; and, while faithful in allegiance to the noble Original whence they derived their start and impetus, they contributed most powerfully,—and in the only competent manner,—to the rapid and solid advancement of these departments of Search. As more appropriate to the nature of our Institute, I would particularly cite the establishment of the

Society of Arts in 1753 for the promotion of Arts, Manufactures, and Commerce, whose definite sphere was found harmonious with the supremacy and province of the Royal Society, since the latter had long discontinued the practical experiments which formed a characteristic feature of its earlier career.

I may note, in passing, Mr. Spencer's proposition that, after the several agencies had been constituted in protection of the most intimate necessities of social existence, the various Professions gradually emerged to exercise the function of what he terms the "augmentation of life";* and as a Professional man, the Actuary obviously may claim inclusion within the boundary of this phrase not merely on the general grounds of admission assigned by Mr. Spencer, but also, in view of the scope of the description, with a unique title to honourable position in the hierarchy so defined.

But another phase of Evolution succeeds this differentiation of function; and, in this further stage, we perceive a process of reintegration. For not only are the separated Bodies connected by the continuous and diffused spirit of the original unity; by the uniform character of the aim of each towards the realisation of a larger common end; but specific modes of consolidation, with preservation of distinctive features, sustain the harmony through the machinery of General Meetings of Societies, of which, I need only mention, in illustration, the British Association for the Advancement of Science, and similar Congresses in our department of work.

This tendency to a wider union is again promoted, in the Sciences and Professions, by the publication of Journals, which possess the two-fold merit of intellectual intercourse between the several Bodies, and the higher merit of avoiding that wasteful dissipation of mental energy, so saddening in the more primitive records of Culture, exhibited in the independent rediscovery of truths and methods which, already secured, had unhappily remained unknown. Resources once acquired are thus permanently amassed in the Treasury of Knowledge for universal and remunerative expenditure.

To adopt an astronomical simile, and transfer to the intellectual firmament the phenomena of the physical universe, the scattered particles of similar phasis coalesce into discrete masses; these again divide into minuter spheres; but still an even more pervasive unity links together the diversified system, and the concurring splendour is ampler and more vivid than the sum of the originally distinctive lights.

* Spencer: Principles of Sociology: Vol. III: Part vii: cap. i.

We observe, throughout, in the Scientific Kingdom, that persistent principle of Rhythm, which Tyndall and Spencer* long ago discerned as an invariable factor in the organic and inorganic worlds; consolidation followed by divergency; and divergency again compacted into a finer and completer oneness.

VI.—The Conditions of Existence of Scientific Societies.

The intellectual *acquisitions* of one stage of Science are transmitted as *powers* and *capacities* to its successor; and this hereditary endowment forms an effective force in sustaining the integrity and vigour of the organised Body. But the bequest confers no absolute and indefeasible title to permanent stability unless it be attended by a ready capability of adaptation to the varying conditions by which the Body is affected and modified. The universal principle, which Sir William Grove† termed "Antagonism", prevails alike in the material universe and in the world of Science and Profession as the touchstone of their fate; the incessant interaction, to employ technical language, between Environment and Organism; between the changing modes and intensities of the one, and the power or impotence in the other of responsive adjustment. In my subsequent suggestions, I shall incidentally deal with this subject, but a reference here is demanded in order to complete the order of Evolution which I have endeavoured to discover, in agreement with the processes observable in the Material sphere, within the compass of development of Scientific and Professional Associations.

VII.—The Bearing of the Preceding Analysis upon the Institute of Actuaries and its associated Profession.

It is a misfortune that no connected history of the Origin and Development of Scientific Societies, on Natural principles, has, so far as I can ascertain, been hitherto attempted, for the subject is one of abiding and instructive interest in the region of intellectual and professional enterprise as affected by social influences; and a consecutive record would reveal, for the guidance of succeeding Institutions, with impressive and luminous effect, the conditions which sustain vitality and the failure of which is premonitive of atrophy and decrepitude. I am, therefore, compelled, in the absence of any chronicle, to deduce, from a miscellaneous and

* Spencer: First Principles: cap. x.
† Lecture at the Royal Institution: 20th April 1888.

fragmentary reading, the teachings and directions which the fortunes of such Societies suggest in relation to our Institute.

In approaching this delicate and difficult subject, I desire to emphasise the distinction which I have delineated between the functions and obligations of a purely Scientific Society and those incumbent upon a Professional Body. The former remains content, as I have mentioned, with the acquisition of facts and their generalised uniformities; its scheme embraces no essential relationship with practical work: it is allied to practice simply as a general theorem to particular cases elsewhere presented; or, figuratively, the Science may be described as extracting the massive blocks of knowledge from Nature's quarry with which the individual Arts and their organic embodiments, the Professions, may erect their appropriate structures adapted to the necessities of life. The *raison-d'être*, on the other hand, of a Professional Body like our own is ineradicably involved in the direct and continuous application of scientific and commercial principles to specific pursuits. Though this demarcation limits to an extent the pertinence of examples furnished by purely Scientific Societies, there yet exist certain general principles expressed in their history which remain relevant to the permanent features of all practical Institutions.

In proceeding to apply those teachings to the Institute of Actuaries and the Profession, I desire also decisively to point out that I venture to utter merely my personal judgments, without committal of the Institute or its Members; and my observations will necessarily assume the form of hopeful prevision without trenching upon the province of definite formal suggestion of the machinery of achievement.

I confess, too, that in touching upon this question, I am apparently violating one of the principles at which I hinted in my former Address: should you blame me, I promise to accept the correction humbly and heartily; pleading only in mitigation that my intention is dictated solely by deep affection of our Institute and pride in the Profession.

All valid change, as Coleridge* indicated, implies (i) its practicability, (ii) its adaptation to existing circumstances, and (iii) its necessity or desirability as a means of accomplishing more effectively the purpose for which the Institution was formed. And, in the survey of any suggested modification, he justly insisted that a distinct conception of the requisite ends should be

* The Friend: Section I: Essay viii.

framed, while a calm and kindly feeling should permeate the discussion.

It is obvious that, in order to maintain adequately its prescribed and destined *rôle*, a Professional Body must be promptly but surely capable of approximately exact response to the varying conditions of its position and the altered requirements which those conditions demand: hence it is imperative that its Constitution should prove of so elastic a character (its adjuncts and mechanism for achieving its professed aim) as to admit of periodical adjustment without abrupt dislocation or discontinuity with its historic past. The grave misfortune of many Societies has resided in the rigid nature of their original framework, which has frequently produced attendant complexity and friction upon any needful project of reform. Moreover we must not forget that a justly conservative spirit in the members of a Body is often pardonably and honourably warranted by the possession of fine traditions which seem indicative of the unwisdom of change. And again it is simply reasonable that any proposed modification should not be exclusively or largely regarded from the point of view of senior members whose career is far advanced, but essentially from that of the younger men whose position and prospects will be affected by the change. The lengthy and matured experience of the former should merely form a portion of the data on which the general judgment should be based.

But environment is incessantly altering; both material, mental, and Social ideals may remain constant, and yet the machinery for their attainment will vary with ampler times. Scientific and Professional Institutions, like other organisms, are but functional expressions of existing requirements and relations; necessity of adaptation, accordingly, not *merum arbitrium*, must, if permanency and efficient fitness are to be conserved, be accepted as a fact of Nature and human life; and the prerequisite conditions simply consist of sagacity, of judgment, and of quiet, maturing wisdom in seizing apt occasions for adjusting, either instantaneously or (more generally) by graduated degrees, the application of Power to the work designed as viewed under wider and clearer light. The end of the journey looms distinct and constant, but the road to be traversed, though ever tending to the goal, will often deviate and diverge. It has accordingly been the fate of Societies, or rather their propitious fortune, to effect this modification from time to time as a title to remembrance and renown.

A.—PUBLIC RECOGNITION.

As a general preliminary remark, I may notice that valid considerations may be urged in favour of the Continental system of direct State encouragement of Scientific Societies, and equally pertinent reasons may be alleged in support of their complete independence. *Non nostrum inter vos tantas componere lites!* But such competing arguments, by the way, scarcely affect,—at least, in a pecuniary sense,—Professional Bodies which find their only unfettered exercise of power in the capacity of self-expression; though, obviously, reasonable inter-relations should exist,—public service on the one side correlated with honour and appeal on the other. And to whatever cause we may attribute the result, it cannot be denied that the Institute does not possess that prominent and authentic position in connexion with the State and Official Legal Institutions to which its admirable history and public utility undoubtedly present an imposing claim. In an organic system in Nature, the symmetric efficiency of the Whole is only achieved by the harmonious interaction of the specialised functions of the Parts; where definite assistance is required for the performance of the general work, it is derived from that individual section which is solely competent of specific supply; and the analogy may be extended to social Institutions and the central governing Body in the State. The latter, it is evident, should depend for its completeness of action, where complicated legislature is attempted, upon provision of counsel from authoritative sources; and it is only by abstracting its nutriment from these specialised organs that an adequate embodiment of its constructive and executive power can be realised. In numberless instances, legislation upon difficult and far-reaching social problems might have been expressed in a more serviceable form; with the absence of misinterpretation; the avoidance of results frequently contravening the intention and spirit of the Enactment; with the prevention of admission of failure which Interpreting and Amending Acts implicitly proclaim, had the Institute of Actuaries as a Body been consulted upon the scope and arrangements of the Bill.

I need only refer to the ineffective and defective provisions of the Married Women's Property Acts as an illustration; and to this I summarily add many wide subjects of a financial character, and all questions affecting Assurance business. When both natural analogies and repeated experience enforce the importance of

technical reference, to what cause must be assigned this fatal omission of appeal? I do not propose to enter into detailed suggestions, so far as the Institute is concerned, since some of my subsequent observations may partially involve my views; but I apprehend that, as regards references to individual Actuaries both by the State and generally, one reason, at all events, may rest in the absence of definition of the title, Actuary. And without some stable and recognised definition, the difficulty will to an extent continue to exist.

B.—The Title of Actuary.

I have devoted considerable attention, for the purposes of this Address, to elucidating the origin and history of our Professional name. The subject, in its earliest stages, is obscure, and, on that ground, the more deeply interesting; and in an Appendix I have furnished the results, in chronological sequence, at which I have arrived respecting its employment from the date of the Roman Consulship to the present time.

It is obvious that no definition of a rigorous and comprehensive character can be verbally expressed, and, on this basis, permanently fixed by Act of Parliament, but the term must be distinguished by way of specific inclusion and consequent exclusion; by the decree, in short, that an Actuary shall be a Fellow of the Institute of Actuaries or of the Faculty of Actuaries.

You will remember that, in the first Number of our *Journal*, the draft of a Bill for presentation to Parliament was submitted, in which an attempt at definition was made by legally limiting the title to certain persons specified in the schedule, and to persons who should thereafter satisfy the tests prescribed by the Institute.

I am hopeful that some feasible plan may be devised of obtaining a legislative acknowledgment of the name and the functions which it implies. The dignified position of the Institute, and the services which its publications and researches have conferred upon Society, amply warrant this pretension to distinct recognition.

C.—Extension of Scope.

Mr. Spencer has continually insisted, with a prodigality of illustration simply marvellous, upon the analogies observable between natural organisms and their development, and human institutions; and one of the most pervasive uniformities to be deciphered, upon which I have already enlarged, is the dependence

of supremacy of life and capacity upon congruity between the Body and its exterior circumstances: surrounding conditions vary: encompassing relations are modified: external forces change their incidence, direction, and intensity,—one increasing with the diminution of another,—while cyclic or periodic variations frequently occur. Triumphant progress is assured when a modification of conditions is swiftly and aptly confronted by fit adjustment in the affected structure; failure of coincident adaptation announces the relinquishment of authority and the advent of decrepitude and decay. An organism, apparently designed for lofty destinies, may thus resign its deputed Trust, or its supremacy may prove a genuine gift through possession of spontaneous wisdom and inherent ability to change with change. Authentic evidence is furnished by the history of our Institute that this primal and aboriginal power of permanent service is its natural dower, and upon us there rests the honoured responsibility, and especially with urgent weight upon our successors, of ensuring, with keen foresight, wise administration, calm and unprejudiced survey, that persistent adaptability should be amply maintained. I venture accordingly to think that the period is rapidly approaching when the revision of our Bye-Laws will require our earnest thought. It is, for example, deserving of serious discussion whether it may not be possible, for the closer integrity and representative completeness of our Corporate life, to extend our range, by including the Managers of Life Offices, who are not Actuaries, in some suitable form and recognised status which shall satisfy their just and legitimate expectations and prove in honourable accord with the high official positions and functions which they sustain in our common sphere; and thus, while still preserving the distinctive province of the Institute, with the technical qualification exclusively defined by its Fellowship, expand and confirm more securely its Representative character. Where a Professional Body, concerned with a limited business, exhibits a diversity of nature and service, the judicious adoption of a scheme of this description tends to distinct consolidation, and excludes the feebleness produced by the formation of different Associations engaged in the same commercial affairs. Such a process aids in the creation and conservation of an *esprit de corps*, with an undivided stimulus and aim; and, thus compacted, a Professional Body presents a practically homogeneous unity, so that its Corporate action, as the expression of its Corporate Will, concentrates the weight and power which alone an organic Profession can command.

The question of appropriate membership to persons pursuing cognate professions, and to persons partially but importantly connected with our practical labours, is also worthy of thoughtful consideration.

The necessity of comprehensiveness and aggregation has been perceived and realised by many eminent Professional Bodies. In the Institution of Civil Engineers (established in 1818 and incorporated by Royal Charter in 1828) I find included distinguished persons, who, though not engaged in technical practice, are competent from their position to render assistance in the prosecution of Public Works; persons again who are eminent in Science and experienced in undertakings connected with the Engineering profession. These are styled "Honorary Members." Members also are admitted, under the designation of "Associates", who, without being Civil Engineers are devoted to pursuits which constitute branches of Engineering, or who, from connexion with Science or Arts or otherwise, are qualified to concur in the advancement of professional knowledge. The Royal Institute of British Architects (incorporated in 1837) comprises "Honorary Associates" who, though not adopting the practice of the Profession, are capable and likely from position, or from prominence in Arts, Science, or Literature, or in matters relating to Architecture, to aid in promoting the objects of the Institute. The Institution of Mechanical Engineers (founded in 1847) admits Members, under the name of "Associate Members", who are attached to any departments of work connected with the practice or Science of Engineering.

I suggest, too, that admission to justly adequate position in our Society of persons holding Actuarial appointments in the Assurance world, and testifying to successful knowledge and capacity as experts, should not be too rigidly limited by the test of examination alone.

In Scientific Societies, it is true that a complex of separate Institutions constitutes a mark of intellectual vigour and enterprise, indicative of enlarging insight into Nature as each successive discovery widens the prospect and stimulates expectant energy; but, in the sphere of a restricted Professional Body, a multiplicity of independent Associations forms an index of weakness unless definite and recognised relationship can be established and maintained. It may not be feasible to amalgamate the various Institutions concerned with our labours, but a genuine scheme of affiliation and associated action and

sympathy may be created, so that, presenting the front of an unscattered Union, the force of aggregated strength and condensed will may be devoted to the attainment of any general end. An instance of the power of allied effort is furnished by the modifications in the Finance Act of 1894 secured by the united weight and representative influence of the Institute of Actuaries and the Life Offices' Association. And this efficiency of sporadic combination may be permanently registered in the form of recognised and formal connection. In this mode of Federation we could also embody the conception of conserving to each section the pursuit of its individual activity and the exercise of its differentiated duties, while maintaining loyal subordination to, and cordial co-operation with, the integrity of the Total which the units compose. This hopeful and helpful consolidation of the several Societies, ministering within our Profession, produced by a fitting and consistent expansion of the range of the Institute, seems to me one of those practical dreams which may be converted into reality by wise and reciprocal concessions. It does not lie within the province I have prescribed for myself to describe any detailed method: with confidence in the future, I am content at present to dream the dream.

It is worthy of record that the Astronomical Observatories of Paris and Greenwich were founded almost contemporaneously with the creation of the Royal Academy of Sciences and the Royal Society,—as though essentially associating Theoretical learning with Practical application. The Royal Society was originally constituted the Director and Visitor of our Observatory, and, since 1847, has shared that duty with the Royal Astronomical Society.

Sir Isaac Newton frequently expressed the hope that Societies for Scientific pursuits should be established throughout the Kingdom; and we all regard with pride the numerous Institutions devoted to our business which, animated by the genius of the Institute, have been organised in many important Cities. I have taken considerable trouble to acquaint myself with their history, and to study the Journals which they publish, and I have been impressed with the value of their contributions to our store of knowledge: especially I have perceived, with unmeasured delight, the testimony they afford of mental activity and eager work in the younger men. The Institute may justly claim a meed of praise in the origination of this intellectual and professional extension. A further hope, accordingly, which I entertain, rests

in the expectation that not merely in London and Scotland, but also in the Provinces and Ireland, these Associations may be affiliated to our central Body as mutually receiving and dispensing counsel and strength. It formed a Capital feature of Bacon's New Atlantis that accessions of knowledge should be procured from external provinces and treasured in "Solomon's House", through the agency of the "Luminis Mercatores", or Merchants of Light.

One of the most efficacious means of integration, to employ Mr. Spencer's phrase, consists in Congresses at stated periods: they cement the scattered energies of the Profession by concentration of toil and personal sympathy: by the stimulating and revealing power of individual intercourse; by the attrition of business asperities through the direct and subtle influence of social goodwill; while they also foster that fusing spirit which connects the several branches of a Profession into a disciplined and genial communion. It may, I trust, be feasible hereafter, by promoting Congresses of the Members of Central and Provincial Institutions, to extend and solidify this unifying attempt.

D.—Teaching and Examinations.

The teaching aims and educational machinery of a Profession are obviously a product of experience, and should be guided and modified by the indications of that experience and the varying requirements of our Professional work. I have referred to the unhappy and natural tendency in Institutions towards framing Rules of Constitution of so inelastic and formal a character as to operate adversely upon that progress which they were intended to promote,—rules so formed indeed as though a tentative and initial stage could adequately represent and sum up the future possibilities of Professional existence and scope: as though, to speak figuratively but justly, the scattered and glimmering light of dawn presented the perfect and illuminated day. The framework of Constitution should clearly be so plastic as to possess an adaptive flexibility, while distinctly precise in spirit, for inclusion of that administrative and executive expansion which accumulating experience may dictate. Hence, in most instances, the Constitution of a Society will demand, for accomplishment of its contemplated purpose, a remodelling of shape in obedience to successive needs,—the definite form being preserved intact with pliant variety of expression. A similar remark applies to the

scheme of education and examination which a Professional Body adopts. We seek to produce, not mere technical experts, but men of judgment: not simply adepts in the conduct of processes, but wise masters of the processes they employ. And though undoubtedly the quality of judgment must be native, developable by actual experience, still the resources and skill of a Professional educator are competent of service in aiding natural endowment by means of the character of his teaching and his examination tests. The very etymology of the word proclaims the lesson. The genuine Educator is not simply the Instructor; he not merely supplies the knowledge which furnishes the basis of judicious work; but primarily and essentially his function is the educing or bringing forth, into prominence and strengthened energy, the faculties which must preside over the utilisation of facts and the application of method. The scheme of the Scientific New Atlantis included the class of selected Novices trained with observant zeal to sustain the traditions of the honoured dead.

In the department of Education, the history of the Institute compels our admiration of the wisdom and judgment with which these imperative obligations have been recognised and discharged; and I desire simply to add a few observations upon the subject of examinations,—bearing fully in mind the profound comment of a distinguished Statesman that examinations do not constitute the ornaments of our mental health, but simply supply the medicines of our mental infirmities.

Recognising the fact that our duty is to promote the cultivation of faculty, and that our essential aim is the closest union of Theory with Practice, our examination arrangements should be sedulously directed towards assisting faculties,—regal among which is the practical judgment,—to develop from a rudimentary to a completer form. The examinations therefore should be devised as a graduated and related scheme throughout their entire course for the express purpose of educing into growing efficiency, the appropriate mental capacities and their application to practical use. Intellectual or mathematical conundrums; mere exercises of mathematical demonstration or analytical ingenuity; detailed arithmetical correctness, are futile, and indeed destructive of the required success. And in intimate connexion with the subject, I will venture to assert that the teaching of the Institute should be intrinsically allied with the system of its examinations,—connected portions of one continuous and consistent scheme,—so that the same process,—in natural and adjusted advance,—may pre-

dominate throughout. The series of examinations again should be particularly designed, with deliberate care, to the cultivation of *judgment* and its exercise upon concrete cases in successive stages of effort, as soon as the elementary facts and instrumental methods have been securely grasped. Reasoned and practical knowledge of essential principles as embodied in our mathematical formulæ, born of mental labour, and not simply minute refinements, should constitute our working ideal. Vast mechanical dexterity may coexist with an absence of mastery of method and its judicious use. A simple question necessitating this thoughtful acquaintance with principles and their steady employment is infinitely superior in its educational and professional value to a complex theoretical problem involving even a supreme amount of mental power and mathematical adroitness. The effective exertion of independent self-originated thought on a student's part in solving an elementary problem of practice forms the genuine test of the adequacy of our system of education and examination. Moreover, it must always be remembered that our examinations are simply qualifying tests and not competitive struggles; and this conception should imperatively prescribe their organisation and the nature and compass of the questions proposed. This suggestion also hints at the undesirability of furnishing for study a specific set of books, which is only appropriate where the examinations assume a competitive, and therefore a largely uneducative, character, when surveyed under a true conception of the genuine aim.

E.—Advice to Students.

This reference to examinations provides a natural mode of transit to some brief observations of encouragement and advice to our students. I would remind them that, although examinations must necessarily form a means, and an essential means, of admission to our ranks, besides possessing the virtue of an aid to mental and moral discipline and aptitude of intellectual concentration,—the ultimate sources of power,—they in themselves constitute but imperfect evidences of Professional fitness, and insecure and precarious modes of obtaining and measuring that soundness of knowledge and validity of judgment which express, in every sphere of work, the finished and efficient force of Professional training. I might almost completely summarise my remarks upon the suitable self-education of a student by bringing into relevant relief the ancient dispute between the Analytical and

Geometrical forms of mathematical instruction.* The Analyst is the speaker of symbolic language; he employs his shorthand signs and the established processes of their relationship and evolvement with exclusion, or rather non-presentation to the mind, of the sensible phenomena or actual conceptions which they represent; his therefore is a purely formal method; while the Geometrical student carries consciously throughout his investigations and calculations the mental notions corresponding to the sensible facts with which his inductions and deductions are concerned. The former course is attended with diminished mental strain; while the latter, difficult in its nature, is instinct with possibilities of the highest and most vigorous intellectual discipline. In illustration of this distinction, consider any of our fundamental symbolic expressions. A student may be master of his representative signs, and, by ascertained algebraical processes, and combinations with other expressions, may deduce various transformations; but if he restrict himself to this symbolic scheme alone, he becomes, from the true aspect of education, but a mechanical, however skilful, workman; the student, however, who realises the mental conceptions which the symbols depict, and rigorously carries these notions in his mind throughout his calculations and deductions, is possessed of the larger gift of increasing intellectual clearness and resource, and competent, therefore, to deal more efficiently with actual practical cases which his work hereafter will present. The intellect thus exercises its free and legitimate sway, and the symbols assume their appropriate position of abbreviated language acting as the vehicle of reasoned thought. Follow then closely the actual original writing inscribed by Truth in place only of the brief shorthand transcript into which it is translated.

Permit me again to impress upon the student, the supreme importance of even a minute amount of knowledge and its application which is secured by an earnest, patient, and thoughtful exercise of his own mind as surpassing, and indeed surpassing beyond calculable measure, the completest accretion of learning which is mainly of a remembered form. Each life should be an independent and original life in the construction of character and mind; each faculty trained by strenuous self-effort which mere recollective habit simply blunts; each result only accepted when grasped and confirmed by arduous personal mental toil, so that memory may be relegated, in the scheme of Professional education,

* Whewell: Of a Liberal Education: Section V.
Whewell: *Thoughts on the Study of Mathematics.*

to its natural office of a storehouse of facts which self-disciplined power has acquired and tested as a portion of the intellectual structure itself.

Be assured therefore that you have not comprehended your formulæ and your equations until you have proved able to translate them into the intellectual conceptions which they pictorially represent, and unless you perceive, not simply the mathematical connexion between the several portions of your symbolic train of reasoning but are capable also of deciphering and realising a rigid and necessary consistency and reasoned sequence between the mental notions which are involved. The natural relationship of the actual facts must be recognised; not merely the formal congruence of the pictured signs.

Bear also in mind the truth that no one can be competently possessed of the import of a proposition until he has acquired the power of expressing it intelligently and securely in his own words. It is a mark of imperfect training and unprogressive education,—a sign indeed of mental retrogression or impotence,—when we continually find in our examinations and elsewhere that a Professional proposition is simply repeated by each student in the language in which it was enunciated by his tutor. In such unhappily frequent instances, the student merely proclaims himself to be,—not an organic bundle of disciplined and alert faculties, but,—simply a common repository of information in which his individuality possesses no part or lot by thoughtful toil. The future of a student is essentially poised upon this pivot: honour and success await the one whose progress signifies the exercise of faculty: failure is predicted by a mechanical dependence upon the energies of others.

I add a word upon the supreme value, as an index of future worth, of that self-reliance in the student which is cultivated by his sole individual search after sources and facts of knowledge instead of ignoble and supine contentment with prescribed courses of study and indicated books. The great Lessing has inspired us by the saying,—and all experience and reflection emphasise its force,—that if the Almighty offered him in one hand the Truth already acquired, and, in the other, the strenuous search after Truth, he should humbly but unhesitatingly prefer the toil of search rather than that degrading abnegation of faculty which he possessed in trust for ardent and self-denying cultivation.

The plastic period of youth alone furnishes the facile occasion

for gradually moulding those indurated Habits (laborious of later acquisition) which will enrich and invigorate all after-life.

Gentlemen-Students, I have delineated a lofty Ideal; but Ideals form the stimulus and reward of life; and so, with a cheerful word of hope to you, I finish my exhortations.

VIII.—CONCLUSION.

It is now my duty and privilege,—compounded, as all final duties are, of pleasant and mournful feeling,—the sadness of retrospect and the hopefulness of vision that scans the future,—to utter a few closing sentences of personal import. For although some months of happy ministry in office still stretch before me, my Address this evening is valedictory in its tone. The recollections of the year are deeply permeated with an abiding sense of the courtesy and goodwill which I have experienced from the Members,—I gratefully extend this expression to each individual Member. Your kindly interpretation of my motives has constantly atoned for my defects of personal service; and as I survey the past, and perceive the frequent occasions on which, with wider knowledge and more sustained sympathy, I could more adequately have fulfilled my duties, the regret which I naturally feel is largely lost, except as a stimulus to the future, in the memory of invariable help and generous encouragement. And intimately interweaved with this experience is the impressive sense I have gained of the distinguished mission of the Institute and its prompt response to its minutest obligations; no sign of decrepitude impairs our hopes; the omens are clearly predictive of enlarged and diffusive power; and, with wise, deliberate, and mature adaptation as its sphere expands, the pride in its history which animates its existing Members will suffer no diminution of intensity or amplitude in the minds of our successors upon whom its fortunes will honourably rest.

APPENDIX.

THE TITLE OF ACTUARY.

I. I have consulted the chief authority in antiquity for the meaning of the Term,—C. Suetonius Tranquillus,—and in his work entitled "De Vitâ Cæsarum": Liber I: Divus Iulius: § 55, the following passage occurs: "Pro Quinto Metello (id est, "oratio) non immerito Augustus existimat magis ab actuaris

"exceptam male subsequentibus verba dicentis quam ab ipso "editam." Here it would appear, from the expression "male subsequentibus", that the Actuarius was simply a shorthand writer; but from a wider examination I am inclined to think that this is possibly too restricted an interpretation, and to conjecture that the reference rather describes *one* only of the functions which he at times exercised.

In the absence of Newspapers in the ancient world, it was difficult to adequately acquaint the citizens with important knowledge, such, for example, as the decrees of the Senate. These decrees, it is true, were committed to writing under the direction of certain Senators, and deposited as State archives in the Ærarium or Treasury; but without public promulgation. Accordingly in the First Consulship of Julius Cæsar, B.C. 59, an edict was issued that Senatorial decisions and other official and civic information should be exhibited for the guidance of the people. These public chronicles of official proceedings and social events were generically termed "Acta." The Acta diurna; Acta publica; Acta urbana, contained a record of the births, marriages, divorces, and deaths; accounts of money transactions between the Treasury and the Provinces; reports of the edicts of magistrates; and extracts from the Acta Senatûs.

But these several Acta were not the same as the Acta Senatûs from which, as I have stated, extracts were incorporated. Now it is clear that the Actuarius was a clerk or subordinate officer, who, in pursuance of the edict of Cæsar, attended the sittings of the Senate; and to him was committed the duty of compiling their Acta, under the superintendence of a superior official, from notes taken "inter loquendum." The Actuarius accordingly made notes of the proceedings in the Senate, and subsequently compiled the Acta or records for publication. His designation is sometimes stated to be "Actarius", which more closely identifies his functions with the preparation of the Acta. An Actuarius also compiled the Acta of a more general character which I have described, and it is stated that he was assisted by the Notarii or reporters who took down in shorthand the proceedings in the legal courts and elsewhere. For a system of shorthand or tachygraphy had been introduced into Rome during the last century of her freedom, and its origin is variously attributed to Cicero, to Mœcenas, and to Ennius. Another class of officials, whose name I have already mentioned, was especially termed the "Notarius", who (as the etymology "Nota", or mark, suggests) was essentially a

shorthand writer: these persons were generally slaves or libertini; and wealthy Romans frequently employed them in their personal service for the purpose, *inter alia*, of copying for private use the contents of the published Acta. At a later stage, the Notarii attended the Emperors as private secretaries, and the class then naturally became constituted of persons of distinction. It was inevitable that the titles of Actuarius and Notarius should continually be regarded as synonymous terms; and after much patient enquiry, I venture to conclude (i) that the various Acta were compiled for public use by the Actuarius; that in the preparation of this work he collected the social events from the official Registers; the decisions of the Magistrates from the shorthand reports of the Notarii who attended the Courts; but that the Acta Senatûs were compiled by him from notes of its proceedings which he himself, and he alone, had taken in shorthand; and (ii) that ultimately the terms Actuarius and Notarius became frequently interchangeable in colloquial usage, based on the fact that tachygraphy was connected with each profession, notwithstanding the distinctive circumstance that shorthand reporting formed the exclusive province of the one, but was associated with the higher function in the other of official compilation.

II.—Passing to more modern times, we find that the Registrar of the Lower House of Convocation is still styled the Actuary. I have failed to obtain much detailed information upon this stage of the history of the name. In 1667, Chamberlayne refers to the Actuary as taking down the decisions of Judges in the Court of Arches; in 1702, Bishop Gibson mentions that he was an officer of the Archbishop, and cites the following passage from the fees established by Archbishop Whitgift (1583–1603), for the Vicar-General's office:—"Feoda Actuario Domûs Inferioris Convocationis solvenda"; while, in 1717, the term is defined by Blount as the title of the scribe who registered the Acts of Convocation.

It seems to me reasonable to suppose that the name was adopted as appropriate to the compilation of the Acts or Proceedings of an important Ecclesiastical Body in analogy with its relation to the Acta of the Roman Senate.

It is probable that the Actuary of the old Amicable Life Office was termed synonymously the Registrar on the basis of this ecclesiastical precedent.

III.—I have been able to trace the history of the title in Acts of Parliament through the courtesy and kindness of Mr. E. W. Brabrook:

i. In the Friendly Societies' Act of 1819 (59 Geo. III, c. 128) it was enacted that a Justice should not confirm any Tables of Payments or Benefits or any Rules dependent upon their calculation unless they were approved by two persons, at the least, who were known to be professional Actuaries or persons skilled in calculation; and that a Society should not be dissolved unless a Certificate had been obtained from two or more professional Actuaries or persons skilled in calculation.

ii. The first mention of the Actuary in connexion with Savings' Banks occurs in the Savings Banks' Act of 1824 (5 Geo. IV, c. 62) where the Certificate of transfer of deposits from one Savings' Bank to another must be furnished by two or three Trustees and Managers attested by the Secretary or Actuary of the Savings' Bank in question: the annual Statement also was to be countersigned by the Secretary or Actuary of the Bank.

iii. This Act was repealed in 1828 by the Act 9 Geo. IV, c. 92, which however re-enacted the provisions relating to the Actuary's attestation of transfers, and his counter-signature to the Annual Accounts.

iv. The Friendly Societies' Act of 1819 was repealed in 1829 by the Act of 10 Geo. IV., c. 56, and the provisions referring to professional Actuaries were not re-enacted. Moreover there is no reference to Actuaries in the provisions relating to the Tables of Contributions and Allowances.

v. The Loan Societies'Act of 1840 (3 & 4 Vict., c.110),—which is still in existence,—provided that a Barrister should not certify the Rules of a Society (where the Society adopted a scheme differing from that contained in the Schedule to the Act) unless a Certificate had been obtained from the Actuary to the National Debt Office.

vi. In the Savings Banks' Act of 1844 (7 & 8 Vict., c. 83) provision was made for the punishment of an Actuary or other Officer who, receiving deposits, failed to hand them to the Managers.

vii. The Friendly Societies' Act of 1846 (9 & 10 Vict., c. 27) required that the Registrar should not certify the Rules of a Society unless it adopted Tables certified by the Actuary to the Commissioners for the Reduction of the National Debt, or by some person who had been connected as Actuary for at least 5 years with a Life Insurance Company in London, Edinburgh, or Dublin.

viii. This Act was repealed by the Friendly Societies' Act of 1850 (13 & 14 Vict., c. 115), but a similar provision to the preceding was inserted applicable to a class of Societies to be termed "Certified Friendly Societies"; and in the Schedule a form of Actuarial Certificate was prescribed.

ix. By the Friendly Societies' Act of 1855 (18 & 19 Vict., c. 63) all previous Acts were repealed, and the requisition of an Actuarial Certificate was restricted to the case of a Society which only assured to its members a certain Annuity or Superannuation, immediate or deferred. The definition of Actuary was amended, and there was substituted for the qualification of having been at least 5 years connected as Actuary with an Assurance Company that of being the Actuary of some Life Office and of having exercised the profession of Actuary for at least 5 years.

x. The Friendly Societies' Act of 1858 (21 & 22 Vict., c. 101) provided that Societies desirous of dissolving should be enabled to refer the appropriation or division of their funds to an Actuary as there defined.

xi. This Act was repealed by the Friendly Societies' Act of 1860 (23 & 24 Vict., c. 58).

xii. By the Savings Banks' Act of 1863 (26 & 27 Vict., c. 87) the previous Savings Banks' Acts were repealed, but clauses were re-enacted relating to the Actuary's punishment if omitting to pay over deposits; his counter-signature of the Annual Returns; and his signature to Certificates of the transfer of funds. This Act is still in force.

This series of Acts, besides revealing the insecure stability of our Legislative measures, is unhappily defective in assisting us to the conception entertained in the earlier stage of the definition of an Actuary. The mischievous conjunction "or" contained in the Act of 1819,—so fertile, in its loose employment, of misunderstanding and misinterpretation,—totally obscures the subject, for we are unable to ascertain with certainty whether the "or" indicated that the mention of "persons skilled in calculation" was intended as a mere synonym or alternative definition of the Actuary, or whether it simply placed together, as equally authoritative, *two* different qualified Referees.