

STATIONARY LINGUISTIC SYSTEMS (HERTZ AND SAUSSURE)

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Abstract

Textual cohesion between *The Principles of Mechanics* (Hertz 1894) and Saussure *Troisième Cours de Linguistique Générale* (1910-1911) as recorded by the *Cahiers* of Emile Constantin (Komatsu & Harris 1993) and their implications for linguistic pedagogic practice are the target of this paper. The textual comparison of two primary sources of mechanics indicate that the Saussurean linguistic system is a Hamilton Hertzian conservative system. Features of a conservative system include homogeneity, equilibrium, an inability to close upon smaller sets, and a lack of attractors (Lorenz 1993: 62). Hence, the anomalies and chaotic factors which emerge in static synchronic discourse models must be a causal consequence of the selected Metagenre of discourse.

Keywords

Genre-shift, inertia, kinematics, mass, mechanics, rhetorical machining

1 Introduction

In this investigation of the application of stationary linguistic systems to second language modelling, the return to primary sources indicated that Charles Bally (1865-1947) and Albert Sechehaye (1870-1946) eliminated Saussure's application of Poincaréan chaotic dynamics, four-dimensional geometries, Hertzian Mechanics, the arithmetical calculus, and wave theory from their posthumously edited 1916 *Cours de Linguistique Générale*. Koerner (1973: 213-242) and Harris (2001: 31-58) describe, in part, the rhetorical machining process undertaken by Saussure's younger colleagues in their compilation of the legendary *Cours* from the fragmentary Saussurean lecture drafts and student notebooks. Unfortunately, furthermore, Bally and Sechehaye effectively blocked any critical appraisal of their editorial work during their lifetime, so it was not until investigation by Godel (1957, 1961, 1966) and Engler (1968) that significant differences between the actual lectures and the 'textbook' that shaped Twentieth Century Anthropology, Language Teaching, Linguistics, Literary Studies, Psychology, and Sociology became apparent.

This displacement by exposure notwithstanding, Saussure still retains the global reputation of being a static theoretician.

In the final quarter of the Nineteenth Century, five 'rapid and extraordinary shifts in the dimension of the world' took place extending upon the effects of railway and telegraph. These were the telephone, phonograph, electric light, wireless, and cinema (Marvin 1988: 3). Patenting and promoting these communication, life-style, and technological changes high-lighted the need to structurally clarify Codes, Conventions, and Signs. Accordingly, a number of national and international conventions were held to callibrate code signification, consistency, and coherence. Concommittently, not only was there a prolific growth in professional organizations, journals, and congresses dedicated towards this goal of standardization, but there was also a move to arithmetize the calculus or to discretize the continuum (e.g., Cauchy, Dedekind, Weierstrass). This move towards number concepts underlying formal analysis forms the defining parameters of 'Generalization' (Schubring 2005). The General Linguistics constructed by Saussure follows within this historical framework of calculus arithmetization.

Bréal, Durkheim, Gablentz, Hegel, Henry, Husserl, James (W), Kruszewski, Paul, Seivers, Taine, Tarde, and Whitney are names frequently associated with the theoretical reconstruction of the Cours (Vendryes 1952; Doroszewski 1931; Dinneen 1969; Jakobson (1960; Koerner 1973; Aarsleff 1982: 356-371; Komatsu & Harris 1993: xi). Accepting Bréal, Henry, Kruszewski, Paul, Seivers, and Whitney as the only pertinent sources from this list, this set of five essays explores the possible influences of Albert

Einstein, Heinrich Hertz, the Berlin School of Mathematics (Georg Cantor, Richard Dedekind, Karl Weierstrass), Henri Poincaré, and Hermann Grassmann upon Saussurean text. Such a radical reappraisal moves Saussure's *Troisième Cours* away from the Newtonian Metagenre and rhetoric of Newtonian discourse wherein Bally and Sechehaye and the Twentieth Century Linguistic Corpus have so firmly sequestered Saussure and returns it to the cutting edge of the new physics and mathematics evident in France, Germany, and Switzerland at the turn of the Twentieth Century. In making this genre-shift, the reappraisal has significant implications for the second language teacher, teacher training, textbook design, curriculum, and for classroom practices.

Michael Faraday (1791-1867), James Clerk Maxwell (1831-1879), and Heinrich Hertz (1857-1894) moved the rationality of science from State to Field Theory. Richard Dedekind, Karl Weierstrass, Gottlob Frege, Giuseppe Peano, Ernest Schroder, moved the rationality of the calculus from the tangents of Newtonian Geometry to Algebra and Arithmetic. This move to 'corral the calculus, from Newtonian tangents and Leibnizian infinitimissals to rigorous, positivist, ordered units, was upset by Poincaré's discovery of chaotic dynamics in mathematics.

There is a general acceptance, if not a criticism, that Saussure was a static linguist responsible for introducing the notions of Newtonian State and Linearity into Modern Linguistics. However, the Constantin Cahiers reveal Saussure was implementing and adapting the text of Einstein, Hertz, Dedekind, Poincaré, and Grassmann in the *Troisième Cours*. It is due to the insights and

methodologies borrowed from the emerging new maths and physics that Saussure considered that he had secured linguistics as a science.

It is Christiaan Huygens who advanced the Wave Theory against the particle theory of Newton. However, it is Heinrich Hertz who made real the fact that electromagnetic waves actually existed in reality. In linguistics it is Schmidt (1872) to whom credit is generally attributed for Wellentheorie, but priority belongs to Schuchardt, who in *Der Vokalismus des Vulgarlateins* (1866-1868) displayed a Stammbaum and concentric circles close together, elsewhere in the text compared language to a pool of water with intersecting waves, and who in 1870 lectured on language classification for his *venia legendi* at Leipzig {Malkiel (1955) & Tagliavini (1963) cited in Morpurgo Davies (1998: 329)}.

2 Hertz and Saussure in Berlin

In the Age of Bismarck, the Second Reich, the German Empire, and following the defeat of France, two young men arrived in Berlin in the autumn of 1878. Heinrich Hertz (1857-1894) arrived from Munich to study electromagnetics under the supervision of Helmholtz and physics under Kirchhoff at the University of Berlin. Ferdinand de Saussure (1857-1913) arrived from Leipzig to study Indo-Iranian under the supervision of Hermann Oldenburg and Celtic and Indian under Heinrich Zimmer at the Royal University of Friedrich William. Hertz spoke French (Hertz & Susskind 1977: 43). Saussure also spoke German. Hertz had a serious interest in Arabic, Greek, and Sanskrit and had been encouraged to become an Orientalist (Hertz & Susskind 1977: 19, 31, 33; (Hertz 1956: xiii). Saussure came from a family

famous in Switzerland for natural science, had studied chemistry, mathematics, and physics for one year at the University of Geneva (Culler 1985: 13), and was an Orientalist. In August 1879 Hertz became a renowned student by winning a physics prize advertised by the Prussian Academy of Science on the question as to whether or not electricity possessed inertia (Buchwald 1994: 59-74; Bryant 1998: 49). In December 1878 Saussure published *Mémoire sur le système primitif des voyelles dans les langues indo-européan*, a methodological work of formal relational analysis which brought him instant renown in the European linguistic community. It predicted the existence of a linguistic 'particle' (a sonant coefficient) whose reality would be confirmed almost fifty years later by the discovery of Hittite cuneiform with its phoneme 'h' (Culler 1985: 14, 65, 66). Both Hertz and Saussure received their PhDs in February 1880 with honours. Hertz went on to become one of the leading experiment physicists of the Nineteenth Century, discovered electric waves, and died at the young age of 37. Saussure died at the comparatively young age of 56, but his posthumous lectures on general linguistics with their notions of the sign code, speech circuit, and static linguistic system went on to dominate Twentieth Century linguistics and text stylistics (Harris 2001: 1) and a number of other intellectual domains. If they did not actually meet, Hertzian and Saussurean text demonstrate remarkable textual cohesion. This essay explores structural similarities between *The Principles of Mechanics* (Hertz 1894), and the three courses on general linguistics given by Saussure 1907-1911 (Komatsu & Wolf 1996; Komatsu & Wolf 1997, Komatsu & Harris 1993).

3 Hertz and Helmholtz

Hertz, like Poincaré, is well-known for his emphasis upon theoretical pictures and images as an aid in understanding the world beyond the senses.

Helmholtz was the leading influence upon Hertz. Helmholtz believed that our experiences are only signs from which we infer the true nature of the causes with the law-like order of the actual being represented in the notational system of our sensory impressions (Heidelburger 1998: 13). An empiricist, Helmholtz believed that science derived its knowledge by generalization via induction. This representation he referred to as Image (Bild). Induction was an incomplete process, and due to our inability to penetrate further, it constituted a kind of anxiety. Signs were at the bottom of thinking (i.e., Boole 1854), and it is only due to their constancy and correspondence that scientific law can be a universal representation (Schiemann 1998: 25-29).

4 Hertz and Modeling

Hertz found that he faced three versions of Maxwell's theory (profoundly unclear if not incompatible) and decided that he would need to disentangle the theory from its various preconceived representations. In adopting this clarification approach, Hertz placed the priority upon theory, i.e., one had to be free of interpretation in order to first compose a theory. This priority led to Hertz's radical removal of both force and energy from theory on the grounds that such formulations were unclear representations (Heidelburger 1998: 18-22). The theoretical model thus becomes the geometry of systems of points - a move in keeping with the age of analytics and discretization. Removal of

force and energy from mechanics is a specifically Hertzian mechanical model. It is important to stress this fact, for this is exactly the same model and on the same grounds as developed by Saussure for General Linguistics.

5 The Principles of Mechanics (Hertz 1894)

The Author's Preface opens with a challenge to Newton's laws of motions as legitimate representations of the elementary laws of Nature for, in reality, Newton's laws of motions only obtain their inner significance and their physical meaning through the tacit assumption of simplicity. In the development of a systematic textbook for the logical science of mechanics, Hertz acknowledges his debt to Helmholtz, Hamilton, and Mach.

5.1 Introduction

In the Introduction Hertz discusses three models of Mechanics, the traditional, the thermodynamic, and his own proposal.

The Introduction commences with a discussion of the conformity between the External and its representations of image and symbol, and the consequent development of models based on images and symbols which can then be used to anticipate future events. It is also these 'adjusted', 'controlled,' and 'manipulated' images and symbols which provide the standpoints and the possibility of comparison of different physical theories.

The customary representation of mechanics is based on the four fundamental interconnected ideas of space, time, force, and mass (Archimedes, Galileo, Newton, Lagrange, d'Alembert). This 'interconnectivity' of the four fundamental ideas separated from

experience provides the simplest image of a first system of principles of mechanics and at the same time the first general image of the natural motions of natural bodies. However, according to Hertz, this customary representation contains logical imperfections, hindrances to clear thinking, artificial difficulties, logical obscurity, doubt, embarrassments, and differences of opinion not compatible with a logically complete science. Hertz traces the origin of the excess relations, obscure feelings, confused wishes, confused questions, painful contradictions, and dilemmas, surrounding the nature of force back to the fundamental laws. He concludes that the answer lies not in finding more and fresh relations and connections, but by following a process of elimination, removal, and reduction. In this manner of analysis our minds will no longer be vexed by illegitimate questions (Hertz 1894: 4-8).

It is the form in which the content is represented wherein the confusion lies, not in the content of the Image devised. It is defects in form which lead to indistinctness, and uncertainty, and therefore a suitable arrangement of definitions and notations could lead to a perfect mode of expression, for groping is inadmissible in a perfect science (Hertz 1894: 8-9).

Hertz observes that in very many cases Force is a sleeping partner when it comes to actual facts and comments on the proliferation of Forces in physics (Hertz 1894: 11-14).

{This proliferation of forces in Nineteenth Century physics is analogous to the proliferation of systems in Twentieth Century linguistic text. The number of systems in the Twentieth Century Linguistic Corpus is

probably indenumerable. See The Prague School of Structural and Functional Linguistics (Luelsdorff 1994) and Lexicogrammatical Cartography (Mathiessen 1995) if one wants an introduction to the problem of counting linguistic systems. In the move to the Age of Information, as opposed to the Age of Reason, this paper proposes that the two proliferations are a matter more of text dynamics than of epistemological reality.}

Hertz introduces his model of mechanics. This model starts with only three independent fundamentals, Time, Space, and Mass, which are connected by the single law of Inertia, and proceeds by stating bare fact without any pretence of establishing it. The entire model and its series of relations belong to the geometry of systems of points. The first advantage of the model is that it enables us to render the most general and comprehensive statements with great simplicity and brevity. The next advantage is that it avoids the expansion and complication of the mechanics of the single point. The emphasis is on the whole system, not on the single point.

Our representation of mechanics bears towards the customary one somewhat the same relationship that the systematic grammar of a language bears to a grammar devised for the purpose of enabling learners to become acquainted as quickly as possible with what they will require in daily life. The requirements of the two are very different, and they must differ widely in their arrangement if each is to be properly adapted to its purpose (Hertz 1894: 40).

Finally, rejecting the Energy model of

Mechanics, Hertz reviews the first and the third fundamentals stating it is important to observe that only one or the other of the two Images can be correct: they cannot both at the same time be correct (··they cannot both be simultaneously correct). The first model refers to "Action-at-a-Distance", the second model to motion in an all-pervading medium. This contrast between the two systems of representation is the field in which the decisive battle between the fundamentally different assumptions must be fought out. To develop the latter in one special direction is the object of the treatise, even if at last the decision should prove unfavourable to the system developed. Hertz selected, like Saussure, to focus on the former.

5.2 A Brief Review

Helmholtz, Hertz, and Saussure saw signs as having an inner and an outer signification. Hertz and Saussure saw signs as forming a whole system, a deductive system of relationships set within a geometry of points. Hertz and Saussure both regarded their theoretical systems as having little or no practical application in daily life and none at all to pedagogic practice. Both Hertz and Saussure sought to push their systems in one special direction, even if at last the direction should prove unfavourable.

Natural systems are chaotic. In order to achieve image clarity, Hertz's model removes all chaotic factors from analysis and concentrates the logical and the rational into one separated, self-contained system. This removed stationary system then acts upon the remainder (The excluded dynamics) by Action-at-a-Distance. Second language teachers, trained in General Linguistics will

recognize this model, but both Hertz and Saussure are adamant that the grammar of General Systems are not devised for enabling learners, This is because General Linguistics is a disabled system, not an enabling system.

The corpus of twentieth century linguistics is based on a Hertzian model of a Hamilton conservative system. The misclassification of language learning to the disabled system commences with Halliday, McIntosh, & Stevens (1964: 15) and Crystal (1968).

Second language teaching belongs in the eliminated and excluded half of the original bifurcation, the half Saussure terms 'The Domain next Door'. It is the Domain next Door which contains the enabling grammar. An enabling grammar bears no relationship to General Linguistics by logical definition. Being placed in the wrong domain and being disabled, it is not surprising that the second language teaching profession is filled with confused dilemmas, illegitimate questions, and painful contradictions.

5.3 Two Sections

The Principles of Mechanics (1894) divides into two sections, 'Geometry and Kinematics of Material Systems' and 'Mechanics of Material Systems'. Twenty-six major structural coincidences occur between The Principles of Mechanics and Saussurean General Linguistics 1907-1911. In the citing system the first number refers directly to the Hertzian paragraph numbering system, and the second number to the page number. Hence, (1/45) refers to Hertzian Paragraph One, Page 45.

5.3.1 Book One

One The subject matter of the first book is based on the laws of internal intuition removed from experience and assertions are made in the a priori judgements in Kant's sense (1/45). Saussurean General Linguistics deal with an internal system, and the steps taken to reach the internal system are taken in accordance with Kantian principles. **Two** The space of the first book is of Euclidean geometry, with all of its properties, immaterial as to the source of the geometry (2/45). The space of Saussurean General Linguistics is Euclidean. **Three** A number of material points considered simultaneously is called a system of material points, or briefly, a system (6/46). Saussurean General Linguistics consists of a system. **Four** The position of a material point can be represented analytically by means of a...coordinates (system) referred to a set of fixed axes (12/48). Hertz's system consists of three coordinates, Saussure's analytical representation of Linguistics consists of a Cartesian set of two axes. These axes are used to separate the diachronic from the synchronic. **Five** The passage of a material point from an initial to a final position, without regard to the time or manner of the passage, is called a displacement (22/52). The direction of a displacement is a straight line (24/52). Displacement, like difference, is a common word in Saussurean General Linguistic text. Saussurean General Linguistics consists of a straight line system. **Six** The addition and subtraction of displacements is subject to the rules of algebraic addition and subtraction (52/60). For Saussurean General Linguistics to be code-based, it must be subject to the rules of algebraic addition and subtraction. **Seven** A system of material points satisfies the conditions of a material

system when the differential of its rectangular coordinates are subject to no other conditions than a series of homogenous linear equations ... (124/80-81). Saussurean General Linguistics is homogenous and linear. **Eight** Straightest Paths (151-154/90). From a given position in a given direction there is always one and only one straightest path possible (161/94). In a holonomous (complete/whole) system every geodesic path is a straightest path (190/103). Saussurean General Linguistics consists of a straight line system. **Nine** According to rules of the differential calculus ... (155/91). Saussurean General Linguistics consists of differences and is represented as the basis of a calculus. **Ten** Kinematics, or the theory of pure motion, treats of the conceivable and possible motions of systems (259/126). Saussure described his system as kinematics.

5.3.2 Book Two

Eleven The subject matter of the second book assumes that the signs and symbols of the system under consideration correspond with objects of external experience, with the properties of such signs and symbols also corresponding to the previous properties assigned by internal intuition. This having been understood, no further appeal is made to experience (296/140). Saussurean General Linguistics follows the same division with *La Langue* being assigned to the internal intuition and *La Parole* being assigned to the external experience. Once these two are assigned and separated, there is no need to connect the separations further. Each serves a different function and purpose derived by their enforced separation. **Twelve** This rule contains nothing empirical which can prevent us from considering time as an always

independent and never dependent quality (298/140). Saussure treated Time as independent to synchronic linguistics. **Thirteen** We determine space relations according to the methods of practical geometry by means of a scale. The scale of the length is settled by arbitrary conventions (299/140). Several times Saussure refers to the scalar properties of language and his sign system is settled by arbitrary conventions. **Fourteen** The indeterminateness which our rules involve and which we have acknowledged, does not arise from the indeterminateness of our images, nor of our laws of transformation, but from the indeterminateness of the external experience which has to be transformed (303/141). Saussure is constantly surprised by the indeterminateness of the internal system. This is not expected nor predicted by Hertzian Mechanics. **Fifteen** By a material system is henceforth understood a system of concrete masses, whose properties are not inconsistent with the properties of the ideally defined system (305/142). Saussurean General Linguistics deals with the concrete as an ideal system.

Sixteen We consider the problem of mechanics to be to deduce from the properties of a material system which are independent of the time those phenomena which take place in time and the properties which depend on time (308/144). Fundamental Law. Every free system persists in its state of rest or of uniform motion in a straightest line (309/144). The aggregate of inferences with regard to a free system and its unfree portions which may be drawn from the fundamental law forms the contents of mechanics. Our mechanics does not recognise other causes of motion than those which arise from the law (311/144). We consider the law to be the

probable outcome of general experience (315/145). The static synchronic system of Saussurean General Linguistics is based entirely upon the properties of the Fundamental Law of Hertzian Mechanics. Static synchronics cannot exist without the Fundamental Law of Hertzian Mechanics. **Seventeen** ..it is sufficient to use the exceedingly probable hypothesis that all discontinuities are only apparent and vanish when we succeed in taking into consideration sufficiently small space and time qualities (317a/146). Saussure held to this position. **Eighteen** It is therefore prudent to limit the probable validity of the law to inanimate systems. This amounts to the statement that the law applied to a system of the third class (all systems containing organic or living beings) forms an improbable hypothesis (320/147). This may explain why language teachers and students 'separate themselves from (the) mechanics' of Saussurean General Linguistics, as Hertz predicted (320/147), even though the law has the character of a permissible hypothesis in such circumstances. This separation would also be in keeping with the definition, distinction, and advice given by Saussure at the close of the Introduction concerning two different grammars. **Nineteen** The law of the conservation of energy...can... completely replace the fundamental law, but still only in its application to holonomous systems (362/158-159). It is the conservation of energy law which enables the description of a static synchronic system in Saussurean General Linguistics.

Twenty ..which we call the centre of gravity of the system (402/167). We have introduced the principles of the Centre of Gravity (407/170). (508/202). Saussure actually placed the centre of gravity of his system in

External Experience, La Parole, and in the Circuit mass, not in internal intuition.

Twenty One If a system is simultaneously coupled with several other system, then the force which the aggregate of these systems exerts on the first is equal to the sum of the forces which the individual systems exert on it (471/192). This proposition permits separated forces of separate systems to be brought together in a rational coupling or compounding with the 'main' system. This permits the various separated forces of La Parole to be treated as a compounded force.

Twenty Two A system whose masses are considered vanishingly small in comparison with the masses of the systems with which it is coupled is called a machine. A machine is thus completely represented, as to its effect on the motion of the other systems by its equations of condition...A machine is called simple when it only has one degree of freedom (531/206-207). A simple machine is represented by a single homogenous linear equation between the forces acting on its coordinates (533/206). If a machine is coupled as to all its coordinates with two or three material systems, then the mechanical connection produced between the latter can be analytically represented by a series of homogenous linear differential equations... (534/206). Conversely, therefore, we can physically interpret any analytical series of homogenous differential equations between the coordinates of two or three systems as a mechanical connection of the kind which we denote as a coupling by means of a machine (534/206). Herewithin is the entire regulatory framework for the Saussurean General Linguistics notions of the sign code, speech circuit, and static system to be treated as a machine, as a calculus.

Twenty Three Those masses whose position still remains unknown when the coordinates accessible to observation have been completely specified are called concealed masses, their motions concealed motions, and their coordinates concealed coordinates. In contradistinction, the remaining masses are called visible masses, their motions visible motions, and their coordinates visible coordinates (596/223-224). This Hertzian distinction clarifies brilliantly the distinction between the concealed masses of La Parole and the 'visible' motions of La Langue (Recalling 'invisible' La Langue has been made 'visible' through its separation from external experiences and its equation with logic, perfection, and rationality - if this is at all possible, rational, and reasonable).

Twenty Four A material system which contains no other concealed masses than those which form adiabatic cyclical systems is called a conservative system (601/225). Every conserved system may be regarded as consisting of two partial systems, of which one contains all the visible masses, the other all the concealed masses of the complete system (602/225-226). The energy of a conservative system is equal to the sum of its kinetic and potential energies (608/227). Thus Saussurean General Linguistics is revealed to be a conservative system with La Langue consisting of kinetic energy and La Parole consisting of potential energy. **Twenty Five** The function H through whose use the equations of motion take the simple form $(U=H)$... is known as Hamilton's function (623/231). The above proposition (628/232-233) bears the name of Hamilton Principle. Its physical meaning can in our opinion be no other than that of proposition (358/158) (Least Time) from which we have deduced the principle

(631/234), (659/249). Hence, Saussurean General Linguistics is revealed to be a Hamiltonian conservative system.

Twenty Six...those systems in which we cannot sufficiently control the visible coordinates so as to retransform the concealed energy at every instant into visible energy are called non-conservative and the forces of their concealed masses non-conservative forces. Non-conservative systems in which the energy tends to change from the energy of the visible masses into that of the concealed masses, but not the conversely, are called dissipative systems, and the forces due to their concealed masses dissipative forces (663/250-251). In general the systems and forces of nature are non-conservative if concealed masses come into consideration. This circumstance is a necessary consequence of the fact that conservative systems are exceptions, and even exceptions attained only more or less approximately; so that for any natural system taken at random the probability of its being conservative is infinitely small. Again we know by experience that the systems and forces of nature are dissipative if concealed masses come into consideration (664/251). It is thus highly unlikely, despite all the rhetoric, schemas, structures, and vocabularies of Hertzian Mechanics that Saussurean General Linguistics is, in reality, describing a conservative system.

5.4 Review

The *La Langue* and *La Parole* Saussurean distinctions correspond to the Internal and External representations made by Hertz. Saussure removes the forces of Speech and Time from the system under consideration and treats the *Langue* system under

consideration as a kinetic system in a Euclidean space. This is a Hertzian methodology for science. The kinetic system is treated as a homogenous system capable of being expressed as a machine linearity. This is a Hertzian representation. Saussure's system is inertial and static due to the Hertzian Fundamental Law of sustained geodesics.

6 Context

The Twentieth Century can be characterized as the linguistic calculus century (Joseph 1995: 221-233). Algebra, Algorithm, Atom, Autonomous, Bridging, Calculus, Code, Combinatorial, Competence, Concatenation, Continuity, Continuum, Core, Correspondence, Discrete, Element, Exhaustive, Extension, Homogenous, Level, Line, Mechanics, Plane, Point, Sign, Strata, State, Syntax, System are normative linguistic key-terms replete throughout the linguistic corpus of the Twentieth Century. *Foundations of Language* (Jackendoff 2002) represents an outstanding example of this Metagenre. It also equally displays the formidable and impossible problems encountered by the Metagenre.

Synchronic linguistics forgets, ignores, and misinterprets its history, for Synchronic linguistics has no history. Eighteen and Nineteenth Century linguistic systems, in general, relied upon historical roots. Twentieth Century linguistic systems, in general, relied upon algebraic roots. Denial of the existence of algebraic linguistic roots, a genre of status, is not possible within the linguistic discourse community of the Twentieth Century. Yet the simple fact is that algebraic roots extend, they cannot

generate difference regardless of the rhetoric and structures of the organising Metagenre.

Information, Randomness, and Incompleteness (Chaitin 1990), *The Limits of Mathematics* (Chaitin 1998), *The Unknowable* (Chaitin 1999), and *Exploring Randomness* (Chaitin 2001) provide an introduction to the impossibility of general systems to reach non-specified detail. *Weak Chaos and Quasi-Regular patterns* (Zaslavsky, Sagdeev, Usikov, and Chernikov (1991) provide an introduction to chaos in Hamiltonian Conservative systems. *The Essence of Chaos* (Lorenz 1993) explains why traditional Hamiltonian Conservative systems cannot have emergent dynamics. *Semiotics and the Philosophy of Language* (Eco 1984) and *The Search for the Perfect Language* (Eco 1995) provides the best introduction to the problems of *Confusio Linguarum* which emerge from the search for the syntax of pure relationship.

Hertz considered the difficulties implicit in Eighteen and Nineteenth Century mechanical systems and concluded that less, not more, and removal of concepts leading to confusion aided clarity. Removal of Hertzian Mechanics from language learning will also aid clarity. Hertz, like Saussure (In the original) would not have approved the application of Hertzian Mechanics to language and society.

Hertz is the great Nineteenth century physicist whose dedication to experimentation, methodology, and careful rigor led to the discovery of electric waves. Yet, immediately following, dying slowly from a painful abscess, Hertz dedicated his remaining time to writing *The Principles of Mechanics*. Ironically, without any denigration of Hertz,

the text - dedicated to the anticipation of future events - makes no reference or prediction concerning the telekinetic possibilities of electric waves. Despite Hertz's rigorous clarity and predictive intention, not one anticipation exists of the future use of electric waves for signaling, radio, television, remote controls, satellite broadcasts, mobile phones, rovers wandering on Mars and transmitting photographs of the planet's surface, deep space probes, the Cassini-Huygens mission to the Saturn systems, or Bluetooth. Nor does the text discuss the pragmatics of experimentation and discovery. Instead, in a remarkable work demonstrating great logical clarity, *The Principles of Mechanics* is dedicated solely to scientific axiomatics in the Age of the Arithmetic Calculus.

The context, frame, rationalization, structure, and vocabulary of *The Principles of Mechanics* provides the scientific and textual background to the *Troisieme Cours de Linguistique Generale* (1910-1911). Yet, *The Principles of Mechanics* provides only an introduction to what it was that Saussure was doing in the *Troisieme Cours de Linguistique Generale*. For from *The Principles of Mechanics* Saussure moved on to tackle the theory of the arithmetization of language according to the Dedekind Dot, the Dedekind Line, and the Dedekind Chain based on the Nineteenth Century Discretization Program, a program based at the Mathematics University of Berlin University.

7 Implications for the Saussurean Second Language Teacher

The second language teacher disenchanted with General Linguistics is best advised to

become a strict Saussurean. For comparison of Saussure's original lectures with *The Principles of a Mechanics* (Hertz 1894) clearly indicates by logical definition that General Linguistics is specifically excluded from second language teaching and learning, i.e., General Linguistics have no claim, entitlement, nor right to trespass upon pedagogy. Their charter of genre operations precludes and proscribes them from pedagogy.

The move of the second language teaching profession to *The Domain next Door* and the expulsion of disabled inertial linguistic systems and disabled linguists from the second language classroom is a genre-shift towards enablement.

The Domain next Door is a dynamic system well-defined by Hertz and Saussure, but it is not part of the reduced sub-system (*The General Genre*) in which Hertz and Saussure were so interested (*The Perfect Language*). The dynamic domain is a real-time system, not an inertial system, and it requires an enabling grammar, not a disabled grammar. See 28 April 1911 for Saussure's description of language learning as an apprenticeship and a performance; 19 May 1911 for the collective intelligence, the *Domain Next Door*, effort required, daily individual use, and the centre of gravity being the social fact of language; 2 June 1911 for the contrast of the two orders, static and evolutionary; 9 June 1911 for the impossibility of combing the two orders in the same perspective; 16 June 1911 for the impossibility of mixing or conflating the static with the evolutionary.

Enabling grammars cope or manage with non-conservative forces dissipative systems, and the experiential. By definition, they are

non-systematic.

The enabling grammars required for a *Wave Mechanics* are agent-based, not algebra-based, and process-based, not product-based. Such a move is a genre-shift away from the rhetorical machining of an analytical, relational syntax system back towards *Evolution*.

No work has been done on *Wave Mechanics* in the second language classroom due to the hegemony of General Linguistics. *Creative Evolution* (Bergson 1911), *Personal Knowledge* (Polanyi 1958), Bourdieu (1977; 1995), and the model of mimesis developed by René Girard provide a methodological base for a *Wave Mechanics* in the second language classroom. Such a wave model dedicated to language communication might be named *Psychotronics*.

8 Implications for the General Linguist

Expulsion of the General Linguist from pedagogy is mandated by the founding charter of General Linguistics. For practical applications, daily needs, human needs, the accidental, the discontinuous, the experiential, impulses, and novelty are all precluded by domain fief. It is also mandated by the nature of General Systems Analysis. {See *Conflicts between Generalization, Rigor, and Intuition* (Schubring 2005)}.

Despite 'System' being the key-defining indicator of the literary genre known as General Linguistics, the drift of General Linguistics from its foundations is so extreme that it is unlikely that one General Linguist in the Twentieth Century knew that their 'System' referred to a Conservative Hamiltonian

System as defined by Hertz. It is this disassociation makes the Twentieth Century Linguistic Corpus literature, not science.

Saussure's system of La Langue is a Hertzian Machine - a grammar disabled from reality, and one differing widely from an enabling grammar.

Disablement is necessary for the notion of a stationary linguistic system. However, the rhetorical machining of non-conservative forces dissipative systems, and the experiential, all-pervading medium by the Linguistic Literateurs to the Meta-genre of a disabled grammar must require more bits of information than exist in the entire universe. This is because disabled systems have no attractors, no forces to impose limitation, and no minimal unit of closure. And, in reality, as Saussure stated clearly: 'There is no such thing as a stationary linguistic system'.

The commencement of the third millennium SAE is a Renaissance epoch, thus the time has come to turn the synchronic text of the Linguistic Literateurs into an object of study rather than to defend its current representation as an instrument of instruction. The study of the dynamics of stationary systems is the best use to which the rhetorical machining of Twentieth Century Linguistic Corpus can be put to, i.e., as a footnote to the nineteenth century's attempt to arithmetize the calculus.

The expulsion of the General Linguist from the classroom also forces the General Linguist to examine the syntax of real-world problems. Disappearing rainforests, disappearing species, over-fishing, disappearing ice-shelves, growing desertification, climate

change, disappearing languages, overpopulation, rampant consumption, Christian-Moslem conflict, political rhetoric and spin, injustice in the courtrooms, and a culture of greed are all language-related symptoms of a synchronic mindset.

The Renaissance epoch into which the global society has entered is a phase transition from the Age of Reason to the Age of Computation and Information. Anything can be reasoned ad infinitum on both sides of the divide, but only information can be computed.

General Linguistics is the field in which the decisive battle between the fundamentally different assumptions of Hertzian Mechanics have been fought out in a convincing manner. That's the results have proved unfavourable to analytics is not an indictment of General Linguistics. The unfavourable results vindicate the experiment, i.e., Convergence and Ratio do not exist in disabled systems. That linguistics lacks ratio in terms of a positivist, natural, whole integer is the only possible conclusion from a review of the Twentieth Century Linguistic Corpus.

...there are natural systems for which the minimum never appears, and for which the variation of these integrals never vanishes (Hertz 1894: 240).

While Non-closure may come as a shock to the rational-minded, the exit from the classical impasse between rational and irrational is a metagenre shift to the fractal world {See The Fractal Geometry of Nature (Mandelbrot 1983)} and to the notion of Attractors.

Gödel (1931), Roe (1977), Garfinkel (1986), Bhatia (1993: 103), and Chaitin (1990; 1998;

1999; 2001) provide further evidence for General Linguistics to move from the Age of Reason to the Age of Computation and Information, i.e., most of the problems of contemporary General Linguistics are genre-based from the Age of Reason.

9 The Relevance of the Paper

The need to limit the arbitrary generally confines linguistic history to the domain of linguistics and inter-linguistic connections. However, in the case of Saussure, he was more influenced by contemporary movements in the new physics emerging at the turn of the twentieth century rather than by other linguists and by linguistic theory. Saussure, who respected linguists, had little respect for linguists as scientists. For instance, in referring to the Neogrammarians he stated: 'It would have done more good if they had been familiar with the natural sciences...It is not that they were lacking in critical spirit, but scientific bases would have been more quickly arrived at' (Komatsu & Wolf 1997: 92). The scientific basis of Saussure's 'System' is Hertz's 1894 Principles of Mechanics.

The second point to make is that if General Linguistics is a conservative Hamiltonian system, then General Linguistics can be integrated with systems theory and the problems of General Linguistics viewed within a systems theory framework. The major rewards of this approach is that conservative Hamiltonian systems, do not reduce and do not have attractors. These two properties of conservative Hamiltonian system explain much about the textual properties of General Linguistic Text.

The third point to make is that if General

Linguistics is a conservative Hamiltonian system, then by definition General Linguistics has no application and use in second language teaching. This is not difficult to confirm either from Hertz or from Saussure. The whole function and purpose of General Linguistic Theory is derived from its complete disablement, isolation, removal, and separation from practical application. In other words, language teaching is part of the enabling domain indicated as extremely important by Saussure but specifically excluded from General Linguistics.

The fourth point is that the Domain next Door is an Agent and Process-based domain incorporating chaos, confusion, and uncertainty and dealing with forces and fields.

The fifth point, once the rhetorical reductive claims of General Linguistic Text are removed from the Twentieth Century Linguistic Corpus, then, rather than the expected data discretization and extension by positivist dimensions, evidence for large-scale emergence related to fractal dimensions becomes apparent, i.e., no foundation exists.

The sixth point is that coherence and relevance are imposed upon the Twentieth Century Linguistic Corpus by relegating it to a footnote to the nineteenth century's efforts to arithmetize the calculus. Unless framed within this historical perspective, the Twentieth Century Linguistic Corpus lacks cohesion and usefulness.

The seventh point is that exclusion from pedagogic issues provides the opportunity for General Linguists to focus on text related to contemporary global society issues.

The eighth and final point is that Psychotronics is probably the most powerful factor influencing human behavior. Psychotronics is a Wave Mechanics of Persuasion.

10 Overview

The same age, the same years, the same city, the 'same' university, the same interests, and the same reputation for brilliance in their student field: is it not possible that Hertz and Saussure met each other in Berlin during 1879-1880? Equally, *La Parole* considered as a concealed, non-conservative, dissipative speech circuit; *La Langue* removed from the experiential world and considered as a visible, homogenous, internal, logocentric, deductive set of relations, a concrete, ideal, static and synchronic system of signs divided into inner and outer with the forces of energy and time both banished by theoretical mandate: is it not likely that Saussure was strictly applying Hertzian Mechanics in his development of General Linguistics?

There is no alternative interpretation. If Saussurean General Linguistics is mechanical, it is mechanical according to *The Principles of Mechanics*. For it is only in Hertzian mechanics that forces are removed and this removal of forces is exactly the bifurcatory methodology used by Saussure to design and develop General Linguistics.

Two major inductions can therefore be made by the textual cohesions between Hertz's mechanical system and Saussurean Linguistics. Firstly, General Linguistics is completely disconnected from and irrelevant to language teaching and pedagogic purposes. Secondly, the Twentieth Century Linguistic Corpus is

best regarded as a data-bank and footnote to Nineteenth Century attempts to arithematize the calculus as a syntax of pure relationships. As a footnote to the analytics of the Nineteenth Century, the rhetorical machining of Twentieth Century Linguistics provides substantive evidence towards both Non-Reduction and Non-Foundations, i.e., stationary linguistic systems do not possess the fixed properties of stationary materials, particles, or substances. Hence, the metaphors, and strategies of the Masonic Metagenre are inappropriately applied.

11 Conclusion

Hertz and Saussure both pushed theory to ideal extremes in order to fabricate a clear image regardless of the outcome. Their shared direction aimed at the elimination of chaos, confusion, and illegitimate questions from modes of representation; emphasized the logical analysis of the elements as carried out in the more recent text-books of mechanics; and was based upon a belief that it is the form in which the content is represented wherein the defects lie. Due to this extreme idealism, it can now be concluded from the Twentieth Century Linguistic Corpus that chaos, confusion, uncertainty, and incompleteness are a scalar fractal inherent to Order and that the methodology of sustainability must be one of practical adaptation to these consistencies of inconsistency.

Aristotle and Bergson both emphasized the bricoleur and *métier* aspect of reality, and the need for constant readjustment and repair based upon real events in an all-pervading medium. The emphasis upon trees in the rhetorical machining of Ideal Systems neglects the trees in Real Systems, while the neglect of

the external world inherent to Ideal System Machines will cause the extinction of the species. 'Life at the Edge of Chaos' (Langdon 1992) and Co-Evolution to the Edge of Chaos' (Kauffman & Johnson 1992) are key papers concerning the survival of information in rugged fitness landscapes.

The loss of the perfect science and the discovery of the precarious planet does not invalidate General Linguistics: however, it does make clear the division between trivia and the true, between the delusions of reason and the numerability of the Computational. It also makes clear the important role of agent and process-based systems in a reality of forces, fields, and unclear representations.

Amplifiers, analogue, and attractors rather than algebra and analytics form the potential framework for a theory of Wave Mechanics.

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