

Henri Laugier, the Science of Work and the Workings of Science in France, 1920-1940

William H. Schneider
Department of History Indiana University - Indianapolis

No one was more aware of the complicated turn of events involved in the creation of the Centre Nationale de Recherche Scientifique in France than Henri Laugier, one of its principal architects and the first director. Speaking during ceremonies after World War Two honoring Jean Perrin, the founding spirit of the CNRS, Laugier noted « *les différentes étapes de cette action constructive répartie sur plusieurs années sont inscrites dans des textes administratifs ou législatifs dont l'exposé même sommaire demanderait de longues heures.* » It involved a wide variety of limited, specific acts, including the creation of, *un corps autonome de boursiers de recherches, de chargés de recherches, de maîtres de recherches, de directeurs de recherches ... puis se créaient ou se développaient les fonds de publication, de missions, d'aides techniques, puis se créaient l'organisation de la recherche appliquée à la défense et à l'économie nationale* »¹. Only after the outbreak of war was the final decree signed into law which established the CNRS on October 19, 1939. Thus, even from a vantage point as close to these events as the 1948 ceremonies at which Laugier spoke, he confessed the difficulty of recounting the creation of the CNRS. "Un jour," he hoped, "des historiens des sciences en écriraient l'histoire." He would not be surprised to find that after 50 years it would take a whole "corps autonome de chargés de recherches" to describe the history of the organization's first half century.

Surprisingly, there has been little written about Laugier and his role in the organisation of science in France. This fact is even more curious because he had such a long and varied career². Perhaps it is the very range of his activities -- researcher and professor of physiology, head of the CNRS, Assistant Secretary-General of the United Nations, patron and connoisseur of modern artists including his close friend Picasso -- that has both prevented him from having an enduring impact on one particular field of endeavor and made it difficult for biographers to categorize him neatly. In fact, when he died, *Le Monde* titled its obituary article "Henri Laugier (1888-1973) : Un éclectique."³

¹ Hommage national à Paul Langevin et Jean Perin (Orleans: Imprimerie nouvelle, 1950), 31.

² Aside from short obituary notices in the journals he founded -- *Travail humain*, 36 (1973), 193-96 and *Biométrie humaine*, 8 (1973), 1-5 -- the best biographical account is in *Biologie et développement. Mélanges ... en hommage au Professeur Henri Laugier*, ed. François Peroux (Paris: PUF, 1968), 7-13. A compilation of Laugier's non-scientific writings is contained in *Henri Laugier, Du civisme national au civisme international* (Paris: Ophrys, 1972).

³ *Le Monde*, 21 January 1973. The epithet prompted a complaint from one of his former students, Eugène Schreider in *Biométrie*

This study is not an attempt to remedy the situation completely but rather to look at the first half of Laugier's career which was devoted to scientific research and culminated in the direction of the CNRS in 1939. If there was a watershed in Laugier's life, it was undoubtedly the Second World War and the fall of France in June of 1940 which forced him first to England and then New York and Montreal where he took a post as Professor of Physiology from 1941 to 1943. While in North America, in addition to his academic duties he was a leading spokesman for the Free French movement. Although he temporarily resumed his title as head of the CNRS with the government in exile in Algiers, Laugier ceded the position to Frédéric Joliot who had been given the same position by the provisional resistance government in 1944. Although he was not director of the CNRS long enough to place a lasting stamp on it (or at least one that would not be profoundly affected by the Vichy and postwar periods), Laugier's background and career until 1940 are worth examining because they reveal much about the general attempt to organize research and especially to bridge the gap between pure and applied science in France during the interwar years. The focus will be less on Laugier's political or organizational role in the CNRS, which are discussed elsewhere⁴, than on his own scientific research within the context of the new fields of the physiology of labor, orientation professionnelle and biotypology which he helped create. To this day there remains a question as to how much of a scientist Laugier actually was. One other purpose of this study is to shed some light on that question. Regardless of the amount of time he spent in the laboratory as opposed to the office, the fact remains that before the creation of the CNRS, Laugier was able to establish an interdisciplinary research program that coordinated work between several important research groups based in the separate fields of physiology, psychiatry and psychology. Laugier established labs, founded journals, and published research results with important applications for industry and government. Needless to say, this was excellent training for the larger tasks that faced him when the CNRS began.

Background and Early Life

Henri Laugier was born in Mane (Basse-Alpes) in 1888, the son of a professor at the Ecole normale supérieure of Aix en Provence. His father's career took the family to other regions of France as part of the regular circuit followed by instructors in the educational system of the Third Republic. As a result, young Laugier attended schools in Embrun (Hautes Alpes), Montbrison (Loire) and Saint Briec (Côtes du Nord) before entering lycée at Grenoble. Despite this moving about, Laugier confessed that in his formative years he led an isolated existence. The future Assistant Secretary-General of the United Nations had not visited another country by the time he finished lycée, and the future patron of the arts had not heard a concert before entering university and had only attended the theater twice. This was typical, however, for the remote Alps region where he spent most of his childhood. Laugier told the story that his father once made a request to take a class of third year students for an overnight field trip to Chambéry. Although considered "d'une audace sans égale," by local authorities, the request was granted. Henri's father showed him the winning essay written by one of the students about the trip after their return, which stated, "nous y avons vu ... d'autres pays ... d'autres gens, d'autres moeurs."⁵

humaine, 8 (1973), 1.

⁴ Jean-François Picard and Elisabeth Pradoura, "La longue marche vers le CNRS (1901-1945)," Cahiers pour l'histoire du CNRS, 1 (1989), 7-40.

⁵ Du civisme nationale, 182. The reminiscence was an introduction to a 1968 proposal to establish a satellite educational television network. The point was to show how quickly times had changed, and it was effective.

During his early education Laugier was, in his own words, "un très bon élève," but with the added confession, "avec tout ce que celle comporte de pejoratif." By this he meant that he was always eager to follow the directives of his parents and teachers. One example he liked to give was the decision whether to study mathematics or philosophy his last year in lycée. Despite Henri's own preference and success in science, his father's advice was, "Je me rejouis beaucoup, mon fils, de tes succès scientifiques, mais n'oublie pas les résultats de ma vieille expérience de la vie: on n'est pas un homme si l'on n'a pas fait sa philosophie."⁶ Laugier followed his father's advice, even finishing first in the philosophy class of forty, but he remained unconvinced he made the right choice. After completing his studies at the lycée, Laugier rejected parental advice to enter one of the "grandes écoles", choosing instead to follow an interest in physiology which had been sparked, ironically, by his philosophy professor's assignment to defend the writings of Claude Bernard in a class debate.⁷

One problem with Laugier's decision was the fact that physiology was only taught in the Ecole de médecine at the University of Grenoble. To his credit he quickly realized that the places to study the subject were Lyon and Paris. With the help of his father's contacts at the Conseil supérieur de l'instruction publique, he transferred to the Faculté de médecine in Paris where Charles Richet held the Chair of Physiology. Laugier was even more interested in the work of Louis Lapicque and Albert Dastre at the Sorbonne. Nonetheless, he decided to finish his medical studies, albeit with the minimum of effort. In the words of one biographer, Laugier became a doctor, "sans avoir touché un bistouri dans un service de chirurgie, sans avoir fait de stage dans un service d'enfants, ni de gynécologie, ni de grande spécialité." The only baby he ever delivered was that of the wife of his colonel when he served in the army⁸. Laugier was equally as selective in how he applied his energies to the study of science. He finished first in general physiology the year he came to Paris, but he was last in botany which he considered a sterile exercise in pure description and classification. Despite the mixed grades, Laugier completed his hospital externship in 1910 and medical degree in 1913. His medical thesis, entitled "Vitesse d'excitabilité et courants induit," was pure physiology, based on work done the year before at the new Institut Marey of Charles Richet. It was his thirtieth scientific publication since a 1908 article in the Comptes rendus de la Société de biologie on correlations between the size of eyes and the brain in lower vertebrates⁹. His military medical service had just begun when it was abruptly interrupted by the First World War. Laugier served on the Western front near Champagne at the beginning of hostilities, but then his regiment was transferred to the Armée de l'Est in the Balkans where combat was more restrained (or non-existent). He returned to Paris after the war to further his studies in physiology, received a scholarship from the Fondation Thiers and completed his doctorat ès-sciences in 1921 writing a thesis on "Electrotonus et excitation"¹⁰. With his second doctorate in hand and the beginnings of a promising research career underway, Laugier was prepared to enter the world of science and politics in Paris between the wars.

⁶ Perroux, 7.

⁷ Du civisme, 116.

⁸ Perroux, 9.

⁹ Notice sur les titres et travaux de Henri Laugier (Paris: Imprimerie de la Cour d'appel, 1928), p. 12.

¹⁰ (Paris: D. Mauny, 1921)

The Applications of Physiology

Laugier's principal research interests after completing his doctorat ès-sciences (besides the measurement of "chronaxie" which was ubiquitous among all of Lapicque's students) were the discovery of a linguo-maxillary reflex and changes induced by chemicals in fermenting milk which he thought produced acquired hereditary characteristics in the bacteria.¹¹ This work was done in the general physiology lab of Lapicque at the Faculté des sciences. Then in 1923 Laugier took a position as director of a new Laboratoire de Physiologie Appliquée à la Prophylaxie et à l'Hygiène Mentale created by Edouard Toulouse at the asile Sainte-Anne. It was an important step for Laugier's career in many ways. First, from the standpoint of scientific research, he had only done limited research of an "applied" nature¹². Most of his work had been on muscle stimulation by electric current. The lab of Toulouse was obviously more concerned with applications of physiological research, and Laugier soon found himself working on questions of muscle fatigue which had obvious uses in the workplace. Much more important, as the name of the lab implies, the new position marked Laugier's entry into the world of postwar utopian science. The horrors of the Great War had been partly the result of scientific advances, but many saw the only answer to mankind's problems coming from an even more general use of scientific knowledge. One of these was Charles Richet who was an outspoken advocate of the use of new discoveries in biology and inheritance to perfect the human race. The most extensive expression of his eugenic thought was *Sélection humaine*, written before the war but published in 1919¹³. Edouard Toulouse also contributed to this stream of writing with *La question sexuelle et la femme* published in 1918, one chapter of which was entitled "La repopulation et l'eugénique." He viewed the problem of insanity (alcoholism, sexual and abnormal perversions) as a manifestation of degeneration, which he considered the equal of tuberculosis or venereal disease, already recognized as "fleaux sociaux." Psychiatry, which studied the problem in this broader social context, said Toulouse, should more correctly be termed "biocratie."¹⁴ As will be seen, Laugier had already demonstrated an interest in educational reform before he came to Toulouse's lab; and he would also maintain a continuing fascination and sympathy with several of the ideas for biological regeneration proposed by Toulouse and Richet and the general power of science to make a better world.¹⁵ But it was a very specific application of biological science to human problems which became the central focus of his professional career in the next two decades: the psychophysiology of labor and the related fields of orientation et sélection professionnelle.

The psychophysiology of labor was an interdisciplinary application of scientific research to very practical problems of human labor. The French scientists who developed the new field included Jean-Marie Lahy and Henri Piéron as well as Toulouse and Laugier. They drew on

¹¹ H. Laugier and H. Cardot, "La réflexe linguo-maxillaire," *Comptes rendus de la Société de biologie*, 86 (1922), 529; "Adaption, transmission des caractères acquis, sélection par concurrence vitale chez le ferment lactique," *Comptes rendus des séances de l'Académie des sciences*, 176 (1923), 1088.

¹² A fatigue study of a typist with Richet in 1913.

¹³ Charles Richet, *Sélection humaine* (Félix Alcan, 1919).

¹⁴ Reprint of a talk to Société medico-psychologique, 27 March, 1933, as quoted in *Mélanges pour le cinquantenaire de l'hôpital Henri Rousselle, 1922-1972* (Tours: Laboratoire Sandoz, 1973), p. 11.

¹⁵ On the former see Laugier, "La formation du médecin," in *Service de France au Canada* (Edition Bernard Valiquette, 1942), 95-121. His most obvious expression of general faith in science was his long association with the Union rationaliste, as will be seen below.

previously established French research traditions -- Lavoisier, Bernard and Marey in physiology; Alfred Binet in psychology -- but their most novel contribution was the development of experimental laboratory methods to study human mental and physical abilities with applications to the selection and training of the work force. Others in France had made individual starts at this before World War One, such as Armand Isambert, Jules Amar and Henry Le Chatelier, but none left a lasting tradition or students to follow them.¹⁶ Lahy, Laugier, Piéron and Toulouse created new institutions or developed close links with existing ones that had an important stake in their research, ranging from schools who trained students, to employers that would eventually hire them. The fruits of their efforts can be seen in many contemporary institutions of vocational guidance, personnel screening and ergonomics labs, along with the intelligence, aptitude and other exams that have become commonplace today. Drug testing and computer-simulated flight training are but the latest legacies of the work they began in the first part of the century. Of the four men, Laugier was the junior member both by age and experience. Edouard Toulouse (born 1865), the psychiatrist of the group functioned as the elder statesman who provided the initial theoretical and institutional base for the others. Lahy (born 1875) was an autodidact who trained himself in both physiology and psychology and was the pioneering experimental genius of the group. Piéron (born 1881) was one of the fathers of twentieth century French psychology who succeeded Binet at his Sorbonne psychology lab and became director of the *Année psychologique* in 1912 when he was only 31. He brought further prestige to the group when he was named to a Chair of the Physiology of Sensation at the Collège de France in 1923.

Edouard Toulouse began his medical studies in his native Marseille before coming to Paris in 1889 as a *médecin adjoint des asiles de la Seine*¹⁷. After completing his medical degree, he quickly gained prominence in the developing field of psychiatry with a study of Emile Zola¹⁸. In 1897 he began editing the *Journal de psychiatrie*, and in 1898 Toulouse was named *Médecin-chef* at the asile Villejuif where he established a *Laboratoire de Psychologie Expérimentale* under the *Ecole des Hautes Etudes* in 1900.¹⁹ The life work of Toulouse's was mental illness, its causes, effects and treatment. The most distinctive feature of his approach to the problem was the breadth of scope with which he viewed it, a perspective which he successfully imparted to all three of his colleagues. Toulouse saw the necessity of crossing disciplinary boundaries in order to examine the many influences on mental illness --psychological, physiological, hereditary -- hence his invitation to Piéron and Lahy to join the lab under the direction of the Rumanian Nicolas Vaschide. First Piéron then Lahy succeeded Vaschide as directors of the lab. After the war Toulouse and Lahy's *Laboratoire de Psychologie Experimentale* moved from Villejuif to the asile Sainte-Anne where it became part of a greatly expanded *Service departementale de prophylaxie mentale*. Three new labs were added including the Physiology lab which Laugier took charge of in 1923. Piéron had already succeeded Binet at the psychology lab of the Sorbonne in 1912 but

¹⁶ For background, see Georges Ribeill, "Les débuts de l'ergonomie en France à la veille de la Première Guerre mondiale," *Mouvement social*, 113 (1980), 3-36.

¹⁷ There are only a few, brief biographical notices on Toulouse, such as Piéron's, "Nécrologie - Dr. Edouard Toulouse," *BINOP*, 2e sér., 3 (1947), 95-96; L. Marchand, "Edouard Toulouse (1865-1947)," *Annales médico-psychologiques*, 105 (1947), 359-60; and André Plichet, "Nécrologie - Edouard Toulouse," *Presse médicale*, 55 (1947), 442. A medical thesis by Sage Michel, "La vie et l'oeuvre d'Edouard Toulouse," (Medical thesis, Marseille, 1979) is a disappointment, containing little more than a summary of the obituaries. There is an entry for Toulouse in the *Nouvelle histoire de la psychiatrie*, Jacques Postel and Claude Quételet eds. (Toulouse: Privat, 1983), 722-23.

¹⁸ *Les rapports de la supériorité intellectuelle avec la nevropathie* (Paris: Société des éditions scientifiques, 1896). He did a second study in the series in 1910 on Henri Poincaré.

¹⁹ This was only the third psychology lab in the country; the other two were the *Laboratoire de Physiologie des Sensations* of Charles Henry and Alfred Binet's *Laboratoire de psychologie physiologique* at the Sorbonne. Ribeill, 20.

stayed in close contact with the Sainte-Anne group.²⁰ Toulouse's answer to mental illness was "prophylaxie mentale," a vague term which recognized eugenics as the ultimate means of resolving the problem by eliminating the procreation of mental deficients; but in the meantime he saw the necessity of identifying the mentally ill and treating them, if possible²¹. To his credit, Toulouse chose as his most important goal the provision of open and free treatment for the mentally ill, with the Hôpital Henri Rousselle being the lasting legacy of his success²². On the other hand, he also supported extensive testing and screening of the population along the lines of the massive American IQ testing of army recruits for the First World War²³. Toulouse saw broad advantages to such testing, not only in identifying those on the lower end of the scale, but also in selecting an elite and determining a proper placement for those in between as well. Never one to be guilty of understatement, Toulouse once proposed, "that entry into every school and factory should be by way of a psycho-physiological laboratory acting as an organ of selection and classification."²⁴ Shortly before the turn of the century, Toulouse began writing books and columns for newspapers and magazines to popularize his ideas. One article written in May 1905 entitled "La crise du travail" was inspired by a series of strikes and demonstrations in Limoges the previous month which Toulouse, true to his principles, considered "simples signes du malaise dont souffre le monde du travail." To study the problem scientifically, he proposed a "Laboratoire du Travail," which he justified as follows. "On a créé à Paris un laboratoire qui analyse les denrées alimentaires et surveille les fraudes. Chacun en a bénéficié.... Plus récemment, on a créé au Conservatoire des Arts et Metiers un laboratoire d'Essais où les produits industriels sont analysés.... Il en resultat par exemple qu'aujourd'hui le médecin peut avoir un thermomètre contrôlé par le Conservatoire et d'une précision certaine. Tout cela est bien. Mais on n'a encore rien fait pour l'étude de la machine humaine, du travailleur."²⁵

Anticipating, in effect, an important part of Lahy, Laugier and Piéron's work in the twenties and thirties, Toulouse predicted how the work of the lab would become an integral part of every enterprise. "Dans chaque industrie, il determinerait la resistance et les aptitudes nécessaires et proposerait une epreuve tendant à sélectionner les travailleurs." As we shall see, things did not work out exactly as Toulouse predicted. For example, his would presumably be an independent, if not government supported, lab that would set standards for all industries and professions. Knowing the standards, it would be the obvious source of information for legislation to monitor working conditions. Moreover, since "un grève est une maladie sociale," the Laboratoire du Travail could be called upon in times of crisis, to "expedier sur place une commission de recherches qui saurait procéder à des études méthodiques, établir des tares et les vices de fonctionnement, signaler les remèdes efficaces."²⁶ The patronnat did not allow such powers to escape its control; in practice each enterprise created its own laboratory; but Toulouse's

²⁰ For the activity of the labs, see Toulouse, "L'Hôpital psychiatrique ouvert et le centre de prophylaxie mentale de la Seine," *Annales médico-psychologiques*, 91(1933), 492; and the article by Toulouse's successor Genil-Perrin, "La prophylaxie mentale à l'Hôpital Henri Rousselle," *Bulletin médical*, 34 (1939), 647-52.

²¹ Toulouse, "L'organisation technique de la prophylaxie mentale," *Annales medico-psychologiques*, 76 (1920), 510-12.

²² Toulouse has left a very complete record of the steps along the way to creating the hospital. One very detailed account written by Toulouse but presented by Laugier to an international congress in Washington is "The Organization of the Psychiatric Hospital and Its Role in Social Life," *Proceedings of the First International Congress on Mental Hygiene*, Washington, D.C., May 5-10, 1930, ed. by Frank E. Williams (New York: International Committee for Mental Hygiene, 1932), 295-352. For a later equally detailed version in French, see Toulouse, "L'Hôpital psychiatrique Henri Rousselle," *Prophylaxie mentale*, 11 (1937), 1-59.

²³ Toulouse, "Prophylaxie et assistance," *Informateur des alienistes*, 10 (1920), 323-25; 327-28.

²⁴ Quoted in E. Gauthier, "Vocational Guidance [in France]," *International Labour Review*, 5 (1922), 710.

²⁵ *Le journal*, 19 May 1905, p. 1, reprinted in Toulouse, *Leçons de la vie* (Paris: Librairie universelle, 1906), p. 209.

²⁶ Pp. 212.

concept of the scientific study of work (as interpreted and implemented by Lahy, Laugier and Piéron) became the fundamental basis of the French school of psychotechnique used by many of these industries. This French approach contrasted with the ideas of the American Frederick Taylor who regarded the worker only from the outside, that is, the activities which could be made more economical and efficient in order to maximize profits. Toulouse, and later Lahy and Laugier, were much more interested in the worker's underlying psychology and physiology.²⁷ They shared the same goal of efficiency but not so much for the sake of profit (which it would improve, they never hesitated to tell employers with whom they worked in the 20's and 30s) as for the sake of keeping the worker/machine in its best condition²⁸.

Toulouse's more practical influence on the scientific study of work in France was to provide for almost four decades an institutional base for those working in the new field of the psychophysiology of labor. In practical terms, this gave Piéron and Laugier for a limited time, and Lahy for a longer time, laboratory facilities for their own and their students' research. In addition, the journals that Toulouse edited permitted them to publish the results of their findings until they were better established and had their own journals to edit; and all of this was in a setting that Toulouse consciously created to facilitate interaction between different disciplines. In describing the need for additional laboratories at his new center in 1922, Toulouse stated, "le champ d'études est trop vaste pour pouvoir être exploité par des efforts isolés." Especially in the area of research, he pointed out, "pour aboutir à des découvertes, il faut organiser un travail collectif auquel contribueraient étroitement des savants et des techniciens physiologistes, psychologues, physiciens et chimistes."²⁹ Henri Laugier was the furthest removed from Toulouse of the three collaborators from the standpoint of age (23 years separated them), as well as training and the amount of time he worked with him (beginning twenty years after Piéron and Lahy). But from the standpoint of breadth of vision, organizational ability, skill in showing the usefulness of science to the rest of society, and the ability to pick and work with collaborators, Laugier was the closest to Toulouse. As will be seen, much of Laugier's work with the physiology of labor and the CNRS in the twenties and thirties resembled Toulouse's in the first decades of the century.

Henri Piéron also demonstrated remarkable organizational abilities in creating the new field of psychology in France, but he did it from well-established positions within the Sorbonne and the Collège de France. Piéron was born in the heart of the Parisian Latin Quarter, where he attended school and spent his whole professional life³⁰. His father, like Laugier's, was an educator

²⁷ On Taylorism in France, see Aimeé Moutet, "Les origines du système Taylor en France. Le point de vue patronal (1907-1914)," *Mouvement social*, 93 (1975), 15-49 ; Patrick Friedenson, "Un tournant Taylorien de la société française, 1900-1914," *Annales ECS*, 42 (1987), 1031-60. A few enterprises adopted Taylor's methods beginning in 1907, but it was Renault's trip to the U.S. in 1911 and his subsequent attempt to implement Taylor's ideas that prompted the strikes and brought such notoriety. Taylor's book was not translated into French until 1912.

²⁸ Lahy was one of the earliest to criticize Taylor in "La méthode Taylor peut-elle déterminer une organisation scientifique du travail?," *Grande revue*, 95 (1913), 545-61. His fuller treatment was *Le système Taylor et la physiologie du travail professionnel* (Paris: Masson, 1916). Although there has been a great deal of literature recently on Taylorism in Europe, only a few scholars have recognized this independent French tradition. Among them are Ribeill and Anson Rabinbach, "The European Science at Work: The Economy of the Body at the End of the Nineteenth Century," in *Work in France*, S. L. Kaplan and C. J. Koeppe eds. (Ithaca: Cornell University Press, 1987), 475-513.

²⁹ Toulouse, "Prophylaxie et assistance," 323.

³⁰ Unlike the others, there is a wealth of biographical information on Piéron. The most complete is his autobiographical account in *The History of Psychology in Autobiography* (Worcester: Clark University Press, 1952), 4:257-78. For obituary notices, see the *Revue de psychologie appliquée*, 14 (1964), 213-18 and the *Journal de Psychologie*, 62 (1965), 139-44. Another indication of Piéron's importance are commemorative pieces, one while he was still alive, *Année psychologique*, 50 (1951), vii-xvi; and another

who taught at the Lycée Saint Louis and eventually became Inspecteur-en-chef of public education³¹. Piéron also had a disagreement with his father over the choice of schools and careers. In this case, the son favored philosophy, whereas according to Piéron, "Mon père, normalien et mathématicien, comptait que je me présenterais à l'École Normale dans la section des sciences et insistait sur les mathématiques."³² One wonders whether this was just a coincidence or if it was an important inspiration for both Piéron's and Laugier's later interest in orientation professionnelle. In a 1953 talk commemorating the 25th anniversary of the creation of the Institut National d'Orientation Professionnelle, Piéron quoted from another of Toulouse's articles for *Le Journal* at the turn of the century which offered a vision of orientation professionnelle sympathetic to both his and Laugier's (not to mention many other French schoolboys') personal experiences. "Un jour viendra," Piéron quoted Toulouse, "où le concours consistera en un examen médico-psychologique dans lequel les aptitudes particulières de chaque individu seront cotées, et aucun père de famille ne poussera son enfant vers un métier ou une profession sans l'avoir fait examiner, comme on fait dès maintenant essayer une machine."³³ Piéron opted instead to study philosophy at the Sorbonne where he eventually passed his license and agrégation in 1903. During his studies he followed the courses of Théodule Ribot and Pierre Janet as well as Lapique who encouraged him to follow his interests in the new field of psychology which was then emerging from philosophy. In fact, it was they who suggested the position as préparateur for Toulouse's lab in 1900 even though Piéron was only 20. The laboratory experience -- especially his participation in the writing of the *Technique de psychologie expérimentale* -- was crucial in his decision not just to study psychology but to do so scientifically, which he did by working on a doctorat ès-sciences completed in 1912.³⁴ In the meantime, Toulouse appointed him managing editor of the *Revue scientifique* in 1904, and when Vaschide died suddenly in 1907, Piéron became head of the experimental psychology lab.³⁵ In addition to completing his doctorate in 1912, Piéron was also named successor to Binet as director of the *Laboratoire de Psychologie Physiologique* at the Sorbonne, and he became editor of *Année psychologique*, a position he held for the rest of his life.³⁶ After the war he was named to a newly created *Chaire de psychologie des sensations* at the Collège de France; and thereafter, he moved from one position of leadership to another in the growing field of psychology both in France and on the international level.

Piéron's importance to the development of modern psychology should not overshadow his contribution to the study of the psychophysiology of work. The common professional interest he shared with Toulouse, Lahy and Laugier was measurement of intelligence, an interest that began when he first started work with Toulouse in 1901. That work naturally increased greatly after he took charge of Binet's lab. In developing new tests of intellectual ability, Piéron remained true to the approach of his predecessor which was in marked contrast to the German and American

on the hundredth anniversary of his birth, Geneviève Oléron, "Hommage à Henri Piéron," *Bulletin de Psychologie*, 35 (1981), 273-94.

³¹ *Autobiography*, 258.

³² *Notice sur ses travaux scientifiques par Henri Piéron* (Paris: A. Davy, 1923), p. 5.

³³ Piéron, "La place de l'Institut dans l'histoire de l'orientation professionnelle," *BINOP*, 2e sér., 9 (1953), 7-8. It should be noted that in his autobiographical piece, Piéron minimized the disagreement.

³⁴ On the importance of Toulouse and his lab, see Reuchlin's contribution to the Oléron Hommage, 285-86.

³⁵ *Autobiography*, 266.

³⁶ One of his competitors was Toulouse who wanted to combine the lab with his at Villejuif. Fraise, "Henri Piéron: instaurateur de la psychologie scientifique," *Bulletin de psychologie*, 35 (1981), 284. Ever the attentive student, Piéron was to merge his lab with the *Laboratoire de Physiologie des Sensations* after Henry's death in 1926. For more on the politics of these decisions see *Autobiography*, 266-67.

obsession with an intelligence quotient³⁷. In opposition to the American search for one number which supposedly measured intelligence derived from a comparison between mental age and chronological age, Piéron -- as Binet before -- insisted on the complex nature of mental ability which could only be revealed by numerous and varied tests of such things as memory, attention, and comprehension.³⁸ Even then, he argued, the results were much more a multifaceted reflection of the individual's abilities than a number to be ranked on a scale. Despite Toulouse's admiration for the broad application of American IQ testing, he was sympathetic to Piéron's skepticism, perhaps because of his training in the clinical method. In their *Technique de psychologie expérimentale*, the co-authors stated, "Le chiffre précise quelque chose; mais il faut connaître ce qu'il est chargé de préciser; le chiffre n'a aucun valeur par lui-même; il illustre, peut-on dire, un phénomène qui prend avec lui une détermination quantitative plus exacte, mais c'est le phénomène qui est le plus important, non son évaluaiton numérique."³⁹ As we shall see, this same appreciation of individual complexity was also a fundamental part of Lahy's and Laugier's approach to the psychophysiological study of work. To the already multifaceted measurements of intelligence developed by Binet and Piéron, they added other mental and physiological tests in order to develop a profile of each worker or student under study. Of the three collaborators, Piéron worked most closely with Laugier, beginning with a study of Parisian school children in the early 20s and continuing through their work in establishing the Institut National d'Orientation Professionnelle in 1928. Piéron also participated in Laugier's Société de Biotypologie and Laboratoire de Biometrie which he was created in the 30s. Even before Laugier left France in 1940, Piéron had agreed to direct the study of pilots and crew for the Armée de l'Air; and he took charge of Laugier's biometrics lab and personnel during the Occupation⁴⁰.

If the main importance of Toulouse and Piéron to psychology and the study of work was to take it out of the academy and into the laboratory, Jean-Marie Lahy took it out of the laboratory and into the workplace. Among his pioneering innovations was one of the the first on-site physiological examination of workers (1908), the creation of the first in-house psychotechnique lab for a company (1923), and the first psychotechnique study of a whole rural community (1935). The list of laboratory instruments he invented for these studies includes a portable device for detecting respiration exchange, automatic recording plotters for reaction times and cardiovascular changes, and devices to test the vision of automobile drivers.⁴¹ Lahy

³⁷ There is a rapidly growing literature on the history of IQ testing in America. For a bibliographical review, see Jonathan Harwood, "The IQ in History," *Social Studies of Science*, 13 (1983), 465-77. For more on Binet, see Th. Wolf, *Alfred Binet* (Chicago: University of Chicago Press, 1973).

³⁸ Reuchlin, *Revue de psychologie appliquée*, 216-17.

³⁹ Quoted from the second edition (1911) in R. Lacombe, "Mesure-t-on les fonctions intellectuelles?" *Revue philosophique*, 104 (1927), 428.

⁴⁰ For more on the aviation tests, see AN 800284, Liasse 5 "Note sur les travaux effectués au Centre Nationale de la Recherche," p. 32; and Piéron, "Tests de sélection en aviation militaire," *BINOP*, 2e sér., 3 (1947), 33-43; 65-74; 110-17. For a more personal account of the occupation, see Piéron, "Souvenirs des années maudites," *BINOP*, 2e sér., 1 (1945), 1-9 and "Necrologie -- Dagmar Weinberg," *Biotypologie*, 8 (1946), 117-19.

⁴¹ Lahy, "Modifications des échanges respiratoires sous l'influence du travail musculaire, une technique nouvelle, ses résultats," *Journal de physiologie et de pathologie générale*, 14 (1912), 1129-37; "Sur l'emploi des appareils de mesure des temps de réaction en psychotechnique. Un appareil nouveau: le chronographe imprimeur," *Travail humain*, 3 (1935), 82-128; "Utilisation de la méthode piézographe pour déterminer les modifications cardio-vasculaires au cours des états émotifs," *ibid.*, 7 (1939), 27-61; and "Tests de vision pour conducteurs d'automobiles: vision nocturne," *ibid.*, 353-400. For years there was only a brief obituary on Lahy written after the war by Laugier in *Travail humain*, 9 (1946), 1; and a longer one by a former student Suzanne Pacaud in the same journal, *Travail humain*, 14 (1951), 338-43. Thanks to the work of Ribeill, Lahy now receives more attention in histories of applied psychology and physiology. See, for example, Ph. Tesche-Rigon, "50 ans de Travail Humain: histoire d'une revue, evolution d'une discipline," *Travail humain*, 47 (1984), 6-11. The most complete study and list of publications is Marcel Turbiaux, "J. M. Lahy (1872-1943): Essai de bio-bibliographie," *Bulletin de psychologie*, 36 (1982-83), 969-85.

published his first article on blood pressure in collaboration with Vaschide in 1902, but his advancement at Toulouse's experimental psychology lab was at first closely tied to Piéron's promotions⁴². Hence, for this and another article published in 1904 he listed his position as simply "élève du Laboratoire de psychologie expérimentale de l'École des hautes études." Only in 1907 when Piéron succeeded Vaschide as head of the lab, did Lahy take Piéron's place as an assistant. In 1912 when Piéron left for the Sorbonne lab, Lahy became Chef de Travaux. Once in that position, although the lab underwent name and affiliation changes, Lahy remained there until the Second World War. Lahy's method of research was meticulous and long term. He was not one to rush to publish his results. For example, he began a study of typists in 1905 and a second study of tram drivers in 1908 and did not publish the results until 1913 and only then, as he noted, because, "une inquietude, née dans le publique, par suite de l'application en France des méthodes de travail américaines," caused him to publish preliminary findings⁴³. He did similar multi-year studies in the 20s and 30s even after he had much better facilities and assistants. Other features of the tram driver and typists studies indicated a pattern for future work. First, as mentioned earlier, Lahy combined psychological and physiological tests which became a basic feature of psychotechnique that distinguished it from Taylorism by its concern with the inner workings of the laborer. Lahy's method, as he later described it with reference to railroad signalmen, was as follows, "Pour étudier les aiguilleurs, nous avons dû apprendre -- autant que possible -- le métier d'aiguilleurs, non seulement au point de vue de la succession des gestes, mais surtout au point de vue des attitudes mentales que commande ce travail. Pour y parvenir, il ne suffit pas d'apprendre le métier comme firent les candidats, mais d'en pénétrer tout le mécanisme psychologique."⁴⁴ Lahy's highly empirical approach to the development of tests can also be seen in the typist study, whereby he divided eleven typists into two groups according to their already established reputations for being good or poor typists. Then following the style of Binet, he submitted them to a wide variety of psychological tests (memory, attention) and physiological tests (ambidexterity, reaction time, resistance to fatigue), and looked for correlations. One of the most effective ways Lahy convinced employers to follow his findings was to show them that they would save money. This proved surprisingly easy to do. In the 1908-13 tram study, for example, Lahy started with a simple assumption (as he had done with typists) about who the best drivers were, namely those who had the fewest accidents and consumed the least electricity. The accident rate was manifest enough, and Lahy was even able to show in his preliminary report that overall electricity use varied as much as 11% between drivers. A new driver might use 35% more power in starting a tram than a good, experienced one⁴⁵. Lahy expanded his study after the war, when the nine electric tram and autobus companies of Paris merged to form the Société de Transport en Commun de la Région Parisien (STCRP), and the president of the new company asked Lahy and Toulouse to apply and extend Lahy's earlier study to the 4500 applicants reviewed each year to drive the 3800 vehicles owned by the company. The most important new development in this work, besides its magnitude, was the fact that the STCRP agreed to build and equip a laboratory

⁴² Vaschide and Lahy, "La technique de la mesure de la pression sanguine," and "Les données expérimentales et cliniques de la mesure de la pression sanguine," *Archives générale de médecine*, 8, (1902), 602-39; 711-79

⁴³ Lahy, "La supériorité professionnelle chez les conducteurs de tramways dans ses rapports avec la consommation d'usage électrique," *Technique moderne*, 7 (1913), 388; "Les conditions psycho-physiologiques de l'aptitude au travail dactylographique," *Journal de physiologie et de pathologie générale*, 15 (1913), 826-34. The complete versions of these studies were published in 1927 and 1924 respectively.

⁴⁴ Lahy, "Le premier laboratoire psychotechnique ferroviaire français au Chemins de fer du Nord," *Travail humain*, 1 (1933), 419.

⁴⁵ *Ibid.*, 390.

for the studies at a new facility in Paris on rue Hainaut⁴⁶ Lahy then developed the tests and trained the personnel to run them for the company. When Lahy published his complete study, he had little difficulty persuading the head of the STRCP to write a preface which proudly announced the annual savings of 150,000 fr. per year from reduced dropout of apprentices thanks to Lahy's screening procedures, plus another 1.3 million fr. saved from fewer accidents⁴⁷. A study ten years later showed a drop in accident rates among drivers from 1.53 to 0.27 per year. By 1938 even though the number of buses and cars in Paris had doubled and automobile accidents had risen by 94%, the number of STRCP accidents had actually declined by 31%⁴⁸. Given this success, Lahy found his services in great demand by such enterprises as the tram systems of Marseille and Liège, the French navy, the Belgian Fabrique nationale d'armes de guerre at Herstal, the Polish railways and several department stores in Paris. There was also an impressive list of foreign visitors who came to study Lahy's new techniques, including delegations or students from Russia, Rumania, Spain and the Netherlands⁴⁹. In the 1930s Lahy created another laboratory for the Chemins de fer du Nord, and Laugier did likewise for the Chemins de fer de l'Etat⁵⁰. More will be said on these last developments after a look at how Laugier came to the study of the science of work.

Laugier in the Twenties:

From the Compagnons to the Conservatoire

When Laugier took up his duties at Toulouse's lab in 1923, he did not immediately begin research on the scientific study of work, despite the progress that had been made by his other three colleagues. Shortly before accepting the appointment as the head of the physiology lab at Sainte Anne, Laugier became involved in a movement for educational reform which kept him from devoting his full attention to the physiology of labor until the end of the decade. For the most part this did not cause him to lose much ground. Toulouse was establishing his open psychiatric hospital; Piéron had his journal, chair, labs and Institute of Psychology to keep him busy; and Lahy had his work with the STCRP which, given his method of proceeding, would take him years to complete. Laugier's detour, meanwhile, rewarded him and the new field handsomely through the new contacts he made in an organization called "Les Compagnons de l'Université nouvelle."

The compagnons hold a special place in the history of educational reform in France because of the dramatic way they first presented their ideas⁵¹. What more dramatic setting to

⁴⁶ Ibid., 1-2. The new facility succeeded in capturing popular attention. See, Jacques Boyer, "Le laboratoire psychotechnique," *La nature*, 53 (1925), 69-75.

⁴⁷ Preface by L. Bacqueyrisse to Lahy, *Selection psychophysiologique des travailleurs. Conducteurs de tramways et d'autobus* (Paris: Dunod, 1927), xi-xii.

⁴⁸ Bacqueyrisse, "La sélection psychotechnique des machinistes et la diminution des accidents," *Travail humain*, 2 (1934), 442-47; Turbiaux, 975.

⁴⁹ Pacaud, 340; Turbiaux, 975.

⁵⁰ Lahy, "Le premier laboratoire psychotechnique ferroviaire français aux chemins de fer du Nord," *Travail humain*, 1 (1933), 409-31; Laugier and D. Weinberg, "Le laboratoire du travail des Chemins de fer de l'Etat," *Ibid.*, 4 (1936), 257-68.

⁵¹ On the compagnons see John Talbott, *The Politics of Educational Reform in France, 1918-1940* (Princeton: Princeton University Press, 1969), pp. 34-64.; and Antoine Prost, *Histoire de l'enseignement en France, 1800-1967* (Paris: Armand Colin, 1968), pp. 405-32.

begin such a movement than the trenches on the front near Compiègne in the summer of 1917. It was there that several soldiers whose university studies had been interrupted by the war -- Albert Giard, Hippolyte Luc, Edmond Vermeil and J. M. Carée -- found themselves stationed; and to take their minds off the fighting they discussed their past and future schooling⁵². By the end of 1917, having arrived at agreement about the future of France and what its schools should be like when the war ended, they drew up a "manifesto" which appeared in February 1918, signed only "Les compagnons." Two Cahiers published under the pseudonym "Probus" followed shortly thereafter which outlined in more detail the two basic goals of the reformers, "Il faut que tous soient instruits," and "il faut en outre que les meilleurs soient tirées de la foule."⁵³ The key institution in the reform was the "ecole unique", which would provide the same basic primary education for all French children, and from which the best would be drawn. The broad appeal of the ideas plus the mystery surrounding their authors (the name "compagnons" was chosen to evoke the Middle Ages) added greatly to the popularity and aura of the group. Then in 1919 they purchased a bankrupt monthly entitled Solidarité and began publishing theirs and others' ideas about educational reform, in the process revealing their names. With the mystery gone and the war over, however, the compagnons soon began to slip into the obscurity of other would-be reformers at the time. Some of their original leaders finished their studies and took posts in the provinces -- Carée, for example went to Lyon where he began an illustrious career as a Professor of Comparative Literature -- membership began to decline and the organization was on the verge of disbanding when in February 1921 Henri Laugier joined and was appointed to the Comité Directeur of the compagnons. Laugier has not left a record explaining specifically what motivated him to join the organization, but there are some obvious reasons why he should have been attracted to its work. He was, like the original compagnons, a World War One veteran whose schooling had been interrupted by the war. Moreover, while completing his studies after the war he held a scholarship from the Fondation Thiers at the same time as Carée who often gathered the other compagnons for discussions and plans⁵⁴. In the end, Laugier's decision to become involved may have been the result of a suggestion from his mentor Louis Lapique. The membership lists of the compagnons show occasional interest by a few well-established educators, professors and journalists. For example, in 1920 Jules Fontegne, a professor of orientation professionnelle at Strasbourg, joined as did Jean Perrin and Yvon Delbos, a future Minister of Education who was then a writer for the *Depêche de Toulouse*. So it was not unprecedented for Lapique who held the Chair of Physiology at the Sorbonne, to join in June of 1920. It was unusual, however, for him to contribute an article to *Solidarité* in January of 1921 on the organization of scientific laboratories, which pointed out that the selection of the best laboratory research personnel might be just as important for education as selecting the best students⁵⁵. The following month Laugier, who was then a préparateur for Lapique, presented himself to the steering committee of the compagnons.

Regardless of Laugier's inspiration, it did not take him long to make a dramatic impact. In the process he demonstrated a knack for organization and action which would be a trademark of his career for the next 50 years. Two months after joining, Laugier presented a proposal to the yearly general assembly for a "campagne d'opinion" to reach the broad public. Almost everyone,

⁵² J.M. Carée, "L'histoire des 'compagnons,'" *Compagnons de l'université nouvelle* (Paris: Fishback, 1920), 3-15.

⁵³ Albert Giard, "La doctrine des 'compagnons,'" *ibid.*, 17.

⁵⁴ Charles-Edward Perrin, "Témoignage d'amitié," *Connaissance de l'étranger. Mélanges offert à la mémoire de Jean-Marie Carrée* (Paris: Marcel Didier, 1964), 40.

⁵⁵ *Solidarité*, 15 January 1921.

Laugier explained, recognized that the goals of the *compagnons* were laudable, but they needed to reach, "non seulement les universitaires, mais le grand public et de faire pression sur le gouvernement et le Parlement pour qu'ils entrent enfin la voie des réalisations."⁵⁶ Despite the radical change this would mean for the organization, the idea was accepted and Laugier was given the title "délégué à la propagande." In the next few months and into the fall, he made plans for a large public meeting to be held in February 1922 on the subject of "l'égalité de tous devant l'enseignement." As main speaker Laugier secured Ferdinand Buisson, a well-known educational reformer and head of the *Ligue des droits de l'homme*. Even more noteworthy for Laugier's later career were several other political and scientific leaders he persuaded to share the podium and make brief remarks. These included Emil Borel, Yvon Delbos, Edouard Herriot and Paul Painlevé. Laugier's choice of topic and speakers (not to mention his grasp of the notoriety the *compagnons* could exploit) produced an impressive response from the public, with over a thousand people crowding into the *Salle des sociétés savantes* for the meeting⁵⁷. The interest continued thereafter as Laugier had hoped. Membership in the *compagnons* immediately increased; Laugier started a "caisse de propagande" for contributions from patrons; and he organized a "soirée dansante" later in the spring, aimed at more of a university audience than the usual "grand bal." In July 1922 another public meeting was held on the subject of the "Ecole Unique" with a similar mix of educators and political figures as speakers, including Léon Blum⁵⁸. The *Comité Directeur* was obviously delighted with its new "commisaire de propagande." At the general assembly of 1922 the General Secretary of the *compagnons* praised Laugier's actions as being "directe, intelligente et intense;" as a result of which the organization's morale was "excellent" and its financial position was "satisfactory." More than that, Laugier's efforts also showed results at the governmental level. After Herriot's victory in the 1924 elections, he appointed a "Commission de l'école unique" with Buisson at its head and Laugier, now president, representing the *compagnons*⁵⁹. Two others on the commission with whom Laugier would later work were Paul Langevin and Jules Fontegne. The commission presented an exhaustive report and recommendations the following year which, although not implemented, became a standard part of educational reformers' plans between the wars⁶⁰. The work of the commission was also a personal milestone for Laugier who now was part of the highest educational and scientific circles of France. In the fall of 1925, when the Radicals under Painlevé formed a new government and Delbos took the Ministry of Education, he called on Laugier to serve as his "chef de cabinet." Although the government soon fell and Laugier went back to presiding over the *compagnons*, another measure of his new stature was that when he finally stepped down as president in April 1929, he was succeeded by Paul Langevin⁶¹. The following year Albert Bayet, an educator who had joined the *compagnons* shortly after Laugier, launched the *Union Rationaliste*, and Laugier was a natural choice for the *Comité de Direction* of the group whose goal was to "défendre et répandre dans le grand public, l'esprit et les méthodes de la science."⁶² The organization quickly grew in size as it became an important center for those interested in scientific reform during the 30's, including Paul Langevin (Vice President), as well as Jean Perrin and Emile Borel (both members of the *Comité d'honneur*). Laugier's work in educational reform in the 20s, thus, helps

⁵⁶ *Ibid.*, 15 April 1921.

⁵⁷ For an admittedly biased report, see *ibid.*, 15 March 1922.

⁵⁸ *Ibid.*, 20 July 1922.

⁵⁹ J.O., *Lois et décrets*, 1924, p.11031.

⁶⁰ J.O. *Documents parlementaires - Chambre*, 1925, annexe 1965, pp. 1798-1858; and Prost, p. 407.

⁶¹ *Université nouvelle*, 4 (1929), 52.

⁶² Albert Bayet, "Notre programme," *Cahiers rationaliste*, 1 (1931), 2.

explain how he became part of this important circle of French scientific reformers during the 1930s.

Laugier's interest in education was also the means by which he became involved in orientation professionnelle. The connection was logical and was recognized by Laugier as early as 1921 in an article he wrote for *Solidarité* entitled, "Sélection: notes éliminatoires et notes décisives." The problem he addressed was the question of how to achieve the second goal of the *compagnons*: "tirer les meilleurs de la foule." The point of Laugier's article was that there should be more flexibility in the examination practice which eliminated a candidate for higher education who received a low grade in any subject. Perhaps Laugier was thinking of his own uneven performance in school when he urged that a candidate be admitted if a mark in a particular subject was high enough to be a "decisive" indication of ability. As he observed, rather than being well-rounded, "les grands producteurs, qu'ils soient littérateurs, savants, industriels, hommes d'action, sont souvent des cervaux extrêmement spécialisés."⁶³ This article marked the beginning of Laugier's long interest in questions of school promotion, grading and examinations as measures of ability. The following year he participated in a study with Henri Piéron and his wife on the validity of the examination for the "certificat d'études primaires" in which they correlated the results with grades for the school year and performance on psychological tests. The findings for 120 Parisian school children were surprising enough to warrant further study. An average of 55% correlation was found between class rank at the end of the year and the results of the exam for the certificate; and only a 20% correlation was found between the exam and the psychological tests. Subsequent studies --including changes in the psychological tests and studies of consistency of grading by comparing the marks of different graders for the same exam -- were given the name "docimology" by Piéron, and in the 20s and 30s became an important part of research in orientation professionnelle⁶⁴. Laugier was also rapporteur of the subcommission on "orientation - sélection" of the parliamentary Commission pour l'Ecole Unique, to which he invited Piéron to give testimony early in 1925⁶⁵. In the meantime, the movement for orientation professionnelle had gained momentum in the French provinces after the war which focused attention on a different aspect of educational reform: the crisis in apprenticeship selection and training. In effect, it was the question of what to do with the school children who did not continue their studies after primary school, a problem that was as crucial for the individual student as it was for the country, given the reconstruction needs and labor shortage after the First World War⁶⁶. The orientation professionnelle movement was broadly based. Several centers had been opened after the war in Strasbourg, Bordeaux, Lyon and other provincial cities. A commission was created by the Ministry of Education in 1922 and Fontegne was appointed "inspecteur" in 1924, but many complained that the movement lacked focus and representation in Paris. In 1928 Fontegne, Piéron and Laugier (the *compagnons* had also established a "commission d'orientation professionnelle") combined their resources to found a center in Paris to be called the Institut National d'Orientation Professionnelle⁶⁷. Its three main goals were to train counselors, conduct

⁶³ *Solidarité*, 15 June 1921.

⁶⁴ One version of the results given at a 1927 conference on psychotechnique was published as "Etude critique de la valeur sélective du certificat d'études et comparaison de cet examen avec une épreuve par tests," *Prophylaxie mentale*, 10 (1935), 11-18.

⁶⁵ *J.O. Documents parlementaires - Chambre*, 1925, annexe 1965, pp. 1806-08.

⁶⁶ There are several histories of orientation professionnelle. One recent study with a good historical perspective is by Michel Huteau and Jacques Lautry, "Les origines et naissance du mouvement d'orientation," *Orientation scolaire et professionnelle*, 8 (1979), 3-43.

⁶⁷ In addition to Huteau and Lautry, see Piéron, "La place de l'institut dans l'histoire de l'orientation professionnelle," *BINOP*, 2e sér., 9 (1953), 7-13.

research and act as an information center including the publication of a journal. Laugier's participation involved teaching physiology to the classes of 45 students each fall who came to Paris to study for a certificate in counselling. He also continued his research on measurements of school children's ability in conjunction with the institute, and in the process he began collaborating with Dagmar Weinberg, a researcher who was to play a crucial role in Laugier's work during the 30s.

Laugier at CNAM:

Physiology and the Science of Work

If Laugier's role in founding INOP was an indication of his increased stature by the end of the 1920s, an even more important development in his scientific career was his appointment to the Chair of Physiologie du Travail at the Conservatoire National des Arts et Metiers in 1929. The Conservatoire had tried to support the scientific study of work in the first decades of the twentieth century by creating a Chaire de l'Hygiene Industrielle in 1912, but it was unable to attract individuals of the caliber of Toulouse, Piéron or Lahy. The chair was held briefly by Henri Pottevin from 1923 to 1928, and another Chaire de l'Organisation Technique du Travail Humain was held from 1920 to 1923 by Jean-Paul Langlois. When Pottevin died in November 1928, the two chairs were combined into a "Chaire de Physiologie du Travail, Hygiène Industrielle et Orientation Professionnelle." Laugier was the first to occupy it⁶⁸. The importance of Laugier's appointment can be seen from the fact that before he went to CNAM he had to rely on his position at the Sorbonne and Toulouse's hospital to earn his livelihood. Beginning as a preparateur de physiologie générale for Lapique at the Faculté des sciences, Laugier was promoted to Chef de travaux in 1923 and Maître de conference in 1929. Given the system of chairs at the Sorbonne, however, he was effectively blocked from further advance until Lapique died or stepped down. Laugier's position as director of Toulouse's Laboratoire de Physiologie Appliquée à la Prophylaxie Mentale at the new Hôpital Henri Rousselle in 1923 might have served his purposes as a research facility (as it had done for Lahy), especially after it became part of the Ecole pratique des hautes études in 1927; but the demand for services at the hospital was so great that most of the lab's activity was devoted to routine tests of patients.⁶⁹ In fact, one of the reasons Lahy developed psychotechnique labs on-site in the 1920s was the lack of facilities at Sainte-Anne. Many of his more theoretical studies in the thirties were done at the facilities he created for the STCRP or the Chemins de fer du Nord rather than at the Laboratory of Experimental Psychology at Sainte-Anne.

Laugier's appointment at CNAM was, therefore, a very important change in many ways. Beyond the obvious increased status and income which permitted him to leave Toulouse's lab, it finally gave him an independent base from which to launch a program of scientific research. He now had students, a laboratory and the prestige of CNAM to conduct studies not just on his own but for government and industry as well. In the next ten years Laugier showed the same capacity

⁶⁸ CNAM. Haute école d'applications des connaissances scientifiques. Programme (1930), 131-36. See also Laugier's opening lecture at CNAM, "La physiologie et la science du travail," *Revue générale des sciences pures et appliquées*, 40 (1929), 1266.

⁶⁹ The number of physiology exams rose from 300 in 1923 to 875 in 1925 and 3,146 in 1927, remaining that high each year thereafter. For tables and charts of services, see Toulouse, "L'Hôpital psychiatrique Henri Rousselle," *Prophylaxie mentale*, 11 (1937), 35.

for direct, intelligent, and intense action that he had demonstrated earlier with the compagnons . The result left a lasting mark on the new field of the scientific study of work. Laugier's research while he was at the CNAM can be divided into three areas: physiology of labor, orientation professionnelle and biotypology. Although there was much overlapping between these fields, the first two represented work begun with or inspired by Piéron and Lahy, whereas biotypology represented an attempt to create a new field of study. Much of Laugier's work on the physiology of labor was similar to Lahy's in psychotechnique with direct applications in industry. For example, Laugier repaired the equipment at CNAM dating from 1910 designed to simulate conditions in a mine, and set students to work on the effects of variations in temperature and pressure. He and his students also conducted studies on the conditions of dye workers, the selection of welders and the work of railroad switchmen. The latter studies were done at the laboratory Laugier designed for the Chemins de fer de l'Etat which opened at the Gare Saint Lazare in May of 1933.⁷⁰

The similarity of Laugier's work to Lahy's should not mask a disagreement between them, at least in emphasis, about the nature of their research. Laugier was generally less concerned about direct applications of his findings to the specific task of selection as demanded by industry, and more interested in discovering basic information with more general applicability. This difference rose most clearly to the surface with the establishment of the railroad laboratories each created in the 30s. The month after Laugier's lab opened at the Gare Saint Lazare, Lahy published an article in the first issue of the *Travail humain*, the new journal they co-edited, entitled, "Le premier laboratoire psychotechnique ferroviare français aux Chemins de fer du Nord."⁷¹ Barely disguising his reference to Laugier's new enterprise, Lahy pointed out that large and expensive facilities did not help show the applications of science to industry when they required "de gros frais pour un rendement, qui parfois, était plus apparent que réel." In contrast, Lahy's approach was to use scientific laboratory methods, but always and above all keeping in mind "le rendement de laboratoire en fonction des besoins de l'entreprise dans laquelle il est intégré."⁷² The result, as could be seen from Lahy's tram study in 1908 through his work for the Chemins de fer du Nord, was a procedure that started with an examination of the specific job for which the industry wished to select candidates, followed by an analysis of requirements for the work (both physiological and psychological), and the design of tests and devices to measure the skills and aptitude of workers. As was his style, Laugier avoided a confrontation and chose not to publish an immediate reply. In fact, it was not until three years later that he responded to the remarks of his co-editor. In an article for *Travail Humain* about the shift of his railroad laboratory to new quarters at Viroflay, Laugier stated, "Ce laboratoire n'a pas été conçu comme un simple organisme d'application devant utiliser les nombreuses données acquises au cours d'un passé récent par les psychotechniciens en vue de la sélection du personnel; il doit être en outre un véritable organe de recherche ayant pour but de faire progresser activement les méthodes et les

⁷⁰ W. Liberson and P. Marquès, "Recherches sur le travail à température élevée effectuées dans une mine artificielle," *Travail humain*, 2 (1934), 39-69; Bonnardel and Laugier, "Aptitudes requises pour le personnel de la fabrication dans les usines de matières colorantes," *BINOP*, 3 (1931), 155-60; H. Laugier, D. Kowarski and D. Weinberg, "Un essai de sélection psychophysiologique d'ouvriers soudeurs," *Travail humain*, 5 (1937), 182-211. On the lab see Laugier and Weinberg, "Etude du métier d'aiguilleur des chemins de fer," *Travail humain*, 7 (1939), 128-46; Laugier and Weinberg, "Le laboratoire du travail des Chemins de fer de l'Etat français," *Travail humain*, 4 (1936), 257. The Director of the railroad was Raoul Dautry with whom Laugier would later collaborate after Dautry became Minister of Armement in 1939 and Laugier headed the CNRS.

⁷¹ *Travail humain*, 1 (1933), 409-31.

⁷² *Ibid.* 410-11..

techniques relatives à l'utilisation rationnelle de la main-d'oeuvre dans une grande entreprise."⁷³ This meant that in theory Laugier's goal was to develop a general method of testing potential employees who could then be matched to the wide variety of positions in the enterprise. Thus, in addition to being inclined towards different sides of the balance between pure and applied research, Lahy and Laugier also disagreed on the fundamental question of whether the worker was selected for the work or the work was selected for the worker.

In practice, the two approaches were not incompatible. Laugier and his students could and did use the findings of Lahy for specific tests and jobs; and as mentioned above, Laugier's railroad lab did a number of studies designed to screen workers for specific jobs such as welding and train switching; and, in fact, the main reason for the move to Viroflay was that there was not enough room at the old facilities for the increasing testing the company required⁷⁴. On his part, Lahy pointed with pride to changes in typewriter design based on the findings of his studies that showed limitations in what typists could do using existing machines.⁷⁵ Not only was the suitability of the work being studied for the worker, but the machine as well, the modern science of ergonomics. Above all, the founding of *Travail humain* was a conscious effort to define the common ground between Lahy and Laugier. In fact, the "Avant-propos" read much like a joint communiqué from a peace conference, defining the field of coverage very broadly, "physiologie du travail, la psychotechnique, l'orientation et la sélection scolaires et professionnelles, le contrôle biologique de l'éducation physique et des sports." If the scope was broad, however, the approach to these subjects would be very carefully watched. "Cette revue ne saurait devenir une revue de physiologie ou de psychologie pures; elle publiera seulement des travaux de cet ordre à partir de l'instant où ces recherches entraîneront ou laisseront prévoir des applications prochaines. Du côté pratique, sa limite se trouvera au point où ces questions d'organisation scientifique du travail deviennent purement économiques, administratives ou techniques, et où les problèmes de biologie humaine cessent d'y jouer un rôle."⁷⁶

This difference in emphasis reveals the importance of Laugier's continuing interest in general questions of physiology after his appointment at CNAM. It was partly a carryover of his previous research as well as the result of his teaching responsibilities at the Faculté des sciences and CNAM. Included was additional work on muscle fatigue, but also new research on blood pressure and kidney functions.⁷⁷ Laugier's effort to determine the general aptitude of workers was consistent with his interest in orientation professionnelle, his second major area of research while at CNAM. These studies grew out of his earlier interest in educational reform and focused on correlating school grades, competitive exams and psychophysiological tests. The subjects varied from Parisian primary school children to baccalaureat candidates and apprentice school graduates. One pioneering study looked at 4800 students at the Faculté des sciences to compare

⁷³ Laugier and Weinberg, "Le laboratoire du travail," 257.

⁷⁴ *Ibid.*, 265-68. In 1935 the number of candidates screened was 1,315; in the first half of 1936 it was 2,238.

⁷⁵ See article by J.-H. Estroup, "Etude psychotechnique de la commande des machines à écrire par le moteur humain," *Travail humain*, 2, (1934), 186-201.

⁷⁶ *Travail humain*, 1 (1933), 1-2. An analysis of the content of articles up to 1940 by Reshce-Rison, 10, shows that the balance was maintained remarkably well. It is telling, however, that the journal was published by CNAM, another indication of Laugier's success in garnering the resources to support scientific work.

⁷⁷ S. Belluc, J. Chaussin, J. Cotyvet, H. Laugier, and Th. Ranson, "Recherches sur la fonction rénale," *Travail humain*, 6 (1938), 437-48. See also A. Fessard, H. Laugier and S. Noud, "Sur un indice de ténacité au cours du travail statique," *Travail humain*, 1 (1933), 32-48; and A.-B. and A. Fessard, D. Kowarsky and H. Laugier, "Action d'exercice physique sur la pression artérielle chez l'enfant: évolution avec âge," *Travail humain*, 2 (1934), 157-85.

differences in science grades between male and female students⁷⁸. Laugier also conducted orientation professionnelle studies of a more "applied" nature, which were commissioned by outside agencies, such as one for INOP on the professional goals of school children and apprentices, and the design of a mobile laboratory for the Ministry of Justice to test delinquents at youth detention centers. The largest of these projects was financed by the Carnegie Foundation as part of an international study comparing access to higher education in several countries. Laugier and Weinberg based the French study on the grading of baccalaureat exams at several Parisian lycées⁷⁹.

Laugier initially collaborated with Piéron in this work, then with Dagmar Weinberg who became an increasingly important researcher in her own right, and whose career also demonstrates Laugier's ability to attract top talent. Weinberg was born in Russia in 1897, then lived in Germany before coming to France after the First World War. She worked briefly with Lahy at Toulouse's lab, then with Piéron before joining Laugier at CNAM. Her first work was compiling extensive bibliographies for the research labs and journals because of her knowledge of several foreign languages; but her mathematical ability and facility with statistics proved to be far more valuable in the highly quantitative fields of psychotechnique and biometrics. Laugier made her Chef de travaux and eventually Directeur-adjoint of the Biometrics Lab at Viroflay⁸⁰. Although Weinberg's career shows the faults in a system which delayed or limited the career advancement of a woman, the fact that she was attracted to Laugier is another indication both of his ability to command the resources to support her work as well as his knack for recognizing talent and allowing it to flourish. The final area of research that Laugier pursued from his new base at CNAM was biotypology. It was, in effect, a new idea, inspired, if not originated, by Toulouse but implemented by Laugier. Its goal, as described in the 1932 founding statutes of the Société de biotypologie, was, "l'étude scientifique des types humains par la recherche des corrélations entre les diverses caractères morphologiques, physiologiques, psychologiques, pathologiques, psychiatriques et l'application de ces données dans les diverses branches de l'activité humaine: eugénique, pathologie, psychiatrie, pédagogie, orientation et sélection professionnelle, organisation rationnelle du travail humain, prophylaxie criminelle."⁸¹ The broad scope was reminiscent of Toulouse's "biocratie" and his call for a single mandatory psychophysiological test of all before entry into school or factory. And with good reason. Toulouse was Vice President of the society along with Piéron, according to whom Toulouse was also the founding inspiration, albeit with so many other projects that he needed to find collaborators. In this case, according to Piéron, the society was "née et a vecu réellement grâce à son Secrétaire général Henri Laugier."⁸² The eugenic purposes mentioned in the founding goals were in keeping with some of Toulouse's long standing interests. His earliest writings sought to

⁷⁸ Laugier and Weinberg, "Etude comparée des notes d'examens des étudiants et des étudiantes en sciences," *Travail humain*, 3 (1935), 62-81. For an example of other work, see article by Laugier, Piéron and Piéron; and Laugier and Weinberg, "Contribution à l'étude du progrès de l'apprentissage et de l'efficiencie du travail dans les activités alternantes," *Travail humain*, 2 (1934), 448.

⁷⁹ P. Grawitz, H. Laugier and D. Weinberg, "Une enquête sur les goûts des écoliers et leurs désirs professionnels," *Biotypologie*, 3 (1935), 8-26; Laugier and Weinberg, "Etude et orientation professionnelle des jeunes délinquants: Un laboratoire ambulante de psychophysologie," *Travail humain*, 4 (1936), 269-79; Laugier and Weinberg, *Recherches sur la solidarité et independance des aptitudes intellectuelles d'après les notes des examens écrits du baccalaureat* (Paris: Chantenay, 1938). For more background on the Carnegie work, see Conference on Examinations under the Auspices of the Carnegie Foundation. Dinard, France (September 16-19, 1938), Paul Monroe, ed. (New York: Columbia University, 1939).

⁸⁰ Brief obituaries can be found in *BINOP*, 2 sér., 3 (1947), 32 and *Biotypologie*, 8 (1946), 116-19.

⁸¹ "Statuts de la Société de biotypologie," *Biotypologie*, 1 (1932/33), 40.

⁸² "Vingt ans de biotypologie," *Biotypologie*, 13 (1952), 1. The President of the society, Charles Achard of the Faculté de médecine was only a figurehead.

determine and correct human problems scientifically through medicine and biology. His Ligue de Prophylaxie Mentale, whose board Laugier joined in 1925 and remained on well after the Second World War, assigned all sorts of effects such as alcoholism, criminality, and sexual perversion, to biological (and usually hereditary) causes. In calling for his open psychiatric hospital, Toulouse had admitted that eugenics was the only long-range solution to problems of mental illness.

In 1931 Toulouse created a new organization with more explicit eugenic goals, the Association d'Etudes Sexologique (with Laugier as a Vice President, Lahy as treasurer and Piéron a founding member). Its goal was to look more specifically at how to correct the many problems of the human race that were the result of the fact that, "La procréation des enfants a été livrée à une véritable anarchie sentimentale. Et l'homme qui a été de bonne heure assez avisé pour chercher le meilleur rendement des animaux domestiques, dont il a perfectionné les races, et qu'il a eu l'idée de châtrer pour les rendre plus dociles, paraît se désintéresser de ses propres rejetons. Si bien que les enfants naissent au hasard des unions; beaucoup sont porteurs de tares qui nécessitent des secours et des soins ruineux, hors de proportion avec les maigres résultats obtenus. La syphilis, la folie et toutes les dispositions morbides se donnent libre carrière."⁸³ Toulouse's new Société de biotypologie fit into this scheme by systematically examining and classifying human beings, a prerequisite to better mating and procreation in the future. It was hardly the first to try to classify human types scientifically, nor was it even the first to do so with eugenic goals in mind. Most notably the founder of eugenics, Francis Galton, endowed a Chair of Biometrics at University College London in 1906 for a similar purpose. The first holder of the chair, Karl Pearson created a school of biometrics which was another inspiration for the French founders of the Société de biotypologie⁸⁴. Like their English counterparts, the French biotypologists followed a similar general path from questionable scientific beginnings to legitimate statistical and human biological research. The first step along these lines was the development of a standard biotypological form which was to be used to record information about subjects in all studies in order to build a common base from which to make broad comparisons of individuals. The task of drawing up such a form was a joint effort between Toulouse's hospital labs and Laugier's CNAM lab, with Dagmar Weinberg acting as coordinator⁸⁵. The form -- following the general methods developed over the years by Lahy, Piéron and Laugier -- was divided into five parts: anthropometry, physiology, general medicine, psychology and psychiatry. The original questionnaire solicited information about such things as hereditary antecedents, ethnic and morphological classification, but because the answers could not be quantified, they did not figure in subsequent studies which followed the general method of constructing a biotypological profile of each individual. Piéron did not exaggerate about Laugier's importance to the society. He not only functioned as Secretary-general but his lab at CNAM conducted many of the studies which were published in a new journal, Biotypologie. Several of them had a very practical bent. For example, one of the first was the compilation of new growth charts for French children which had not been changed since 1910. Almost 7,000 Paris school children of ages 5 to 13 were examined and the results published in 1935. Another study was conducted for the Ligue nationale contre le péril vénérien to determine the biotypological profile of a group of children whose mothers had been treated for syphilis. By the end of the 30s Weinberg was comparing the

⁸³ Toulouse, "Le problème sexologique," Bulletin de l'Association d'études sexologiques, 1 (1932), 2-3.

⁸⁴ Eugène Schreider, "Henri Laugier (1888-1973), Biométrie humaine, 8 (1973), 5; Donald A. MacKenzie, Statistics in Britain, 1865-1930 (Edinburgh: Edinburgh University Press, 1981), pp. 102-18.

⁸⁵ Laugier, Toulouse and Weinberg, "Biotypologie et classification scolaire," Prophylaxie mentale, 9 (1934), 125-27.

biotypological profiles of children according to the standard of living of their parents⁸⁶. The point here is not to give a detailed analysis of the work of the society but to indicate again Laugier's abilities as an organizer of science to mobilize the resources, draw people together from a variety of disciplines, establish a scientific society and journal, conduct research and publish results. The work continued at Viroflay under the name of the Laboratoire de Biometrie after Laugier resigned his chair at CNAM in 1937 to take his new positions as Chair of Physiology at the Sorbonne and chef du Service centrale de la recherche scientifique, created in January 1937⁸⁷.

Laugier's appointment at the Sorbonne was largely honorary. Two years earlier he had been made Professor without chair, so the promotion was not unexpected. His new responsibilities in government -- in 1938 he even served for a while in Delbos's Ministry of Foreign Affairs -- prevented him from functioning in the new university position before the war. He did, however, keep an interest in research through the biometrics laboratory. Begun in 1933 at an apprentice school of the railroads at La Garenne-la-folie, Laugier's work with railroad personnel moved to the facility at the Gare Saint Lazare later that year and in May of 1936 to the much larger building at Viroflay. Two separate developments helped Laugier transform the onsite industrial lab into a government supported biometrics lab. First was the nationalization of the French railroads which meant that the lab was no longer privately owned. This had begun in 1908 when the Chemins de fer de l'Etat was created, and was completed in August 1937, i.e. shortly before Laugier left CNAM, with the establishment of the SNCF⁸⁸. More important, as was noted above, Laugier had designed the lab all along as a more general research facility than the labs of Lahy;. This was most obviously reflected in the name Laugier chose "Laboratoire du travail" rather than "Laboratoire de psychotechnique." The result was that it did not require a great change in mission or personnel to make the Viroflay facility into a more general research lab of biometrics. The first credits from the Caisse nationale had already been obtained in 1936, and on June 15, 1937 Perrin's Conseil de la caisse officially established it as the Laboratoire de Biometrie of the government. Over 500,000 francs went to the lab between 1936 and 1940⁸⁹.

The work of the biometrics lab continued much as it had before Laugier assumed his new positions. Laugier remained Director, but Dagmar Weinberg effectively ran the facility. Freed from dependence on the railroad, the lab could undertake studies without direct applications, such as the study of correlations between biotypology, family background and performance in school. Then an important change occurred after the Munich Crisis when war began to loom on the horizon, and plans were made to use the biometrics lab for war mobilization. A June 19, 1939 meeting of the Conseil Superieur de la Recherche Scientifique set the following tasks for the Laboratoire de Biometrie in the coming fiscal year, "les méthodes de sélection des pilotes d'avions, des pointeurs de tir, des télémétristes; l'étude des conditions de travail en atmosphère close (fortifications, coupoles de tir, etc....) For this work the Council established a credit of

⁸⁶ A.-B. and A. Fessard, J. Laufer, and H. Laugier, "Nouvelles tables de croissance des ecoliers parisiens. Poids. Taille" *Biotypologie*, 3 (1935), 106-45; Toulouse, M. Badonnel, Kacelenbogen, and Weinberg, "Enquête sur un groupe d'enfants issus de mères syphilitiques traitées," *Biotypologie*, 4 (1936), 7-39; P. Delaporte and D. Weinberg, "De quelques aptitudes physiques et mentales des enfants et de leur valeur réussite scolaire en relation avec le niveau de vie des familles. Analyse statistique et factorielle," *Biotypologie*, 7 (1939), 161-91.

⁸⁷ Picard and Pradoura, 26-28.

⁸⁸ Lucien Vilain, *L'évolution du matériel moteur et roulant des Chemins de fer de l'Etat* (Paris: Editions Vincent Fréal, 1967), 19-28.

⁸⁹ C. Jacob, "Rapport à Monsieur le Ministre de l'Instruction Publique sur le CNRS," (July-December 1940), p. 43, Archives du CNRS in process of classification; Picard and Pradoura, 28.

200,000 francs⁹⁰. In giving up one patron and set of responsibilities, the lab had acquired a new one in the form of the French government which now had its own applications for the lab. The effect was to transform it into a psychotechnique lab in the style of Lahy. Instead of serving industry, the biometrics lab would serve government needs. A subsequent report by the CNRS after the outbreak of war spelled out the laboratory's work in greater detail, especially the training of pilots. In addition, the report went on, "les méthodes de sélection établis par le laboratoire de Viroflay sont actuellement appliquées aux Etablissements Hispano-Suiza, et aux Forges de Chatillon-Comentry, où un laboratoire a été créé. Un chargé de missions du centre organise des laboratoires semblables à Bordeaux et à Sochaux."⁹¹ After the armistice and departure of Laugier from France, the Laboratoire de Biometrie and its personnel moved to the recently completed INOP building on rue Gay-Lussac where Piéron directed its work. Despite the trying wartime conditions 483,000 francs went to the lab from 1941 through 1943, which supported work done in such areas as the physiological growth of school children (dramatically arrested during the first few years of war), screening of applicants for various technical schools (géomètres, guides, TSF, Chasseurs bottins, Vins et spiriteux) and the selection and training of personnel for Air France⁹². The Air France work was particularly reminiscent of the prewar studies by Lahy and Laugier, with negotiations and design of tests over a period from July 1943 through July 1944.

The Biometrics lab also managed to survive the reorganization of the CNRS in the postwar years. This was largely thanks to the residual influence of Laugier who, although no longer head of the CNRS, nonetheless resumed titular direction of the lab. It was placed under an umbrella organization called the Centre d'Etudes Scientifiques de l'Homme, headed by L. C. Soula of the Faculté de médecine of Toulouse, who also assumed the Presidency of the Société de biotypologie after the war. The lab only conducted limited work in the late 40s, however, with its main source of subjects for study shifting to army personnel rather than school children. When Laugier returned to France in 1951 from his service at the United Nations, he took up his duties at the Sorbonne and began to make the work of the biometrics lab blossom again almost as in the days before the war. A variety of studies were begun, but most significant to the continuing existence of the lab was Laugier's ability once again to attract researchers, especially Eugène Schreider, a former student in the 30s who directed an anthropology lab at the Ecole pratique des hautes études. When Laugier retired from the Sorbonne in 1956 he continued to work in the lab until the end of the decade. Then with the retirement of Soula in 1961, the Centre d'Etudes Scientifiques de l'Homme was divided into a Laboratoire de Physiologie du Travail and the Laboratoire de Biometrie under Schreider⁹³.

⁹⁰ AN 800284, liasse 5, "Rapport sur l'activité du Centre nationale de la Recherche Scientifique Appliquée", p. 27.

⁹¹ AN 800284, liasse 5, "Note sur les travaux effectués au Centre national de la Recherche Scientifique," p. 32.

⁹² AN 800284, liasse 203 "Laboratoire de Biometrie Humaine (presumably by Piéron), dated 1945.

⁹³ "Directoire du CNRS. Procès verbaux, 29 June 1961", p. 10. On the work of the lab, see CNRS. Rapport d'Activité for the Centre d'études scientifiques de l'homme, 1950-1960.

Conclusion

This study has shown that Henri Laugier's career in the twenties and thirties prepared him well for his work in the CNRS. Over and above his general ability to produce results and get things done, one can point to three specific features of his scientific research that coincided with the new directions to be taken by the recently created French agency for scientific research. First, his experience included important work outside the usual elite university research centers. Although Laugier eventually held a chair at the Sorbonne -- signifying his arrival at the traditional pinnacle of prestige -- his major lab work had been at CNAM and INOP. Hence, Laugier could see the value of institutions operating outside the usual grandes écoles/university circles. With a foot in both camps Laugier could also present himself as an arbiter in disputes between traditional institutions and new research labs created and supported by the CNRS.

Secondly, Laugier had worked largely in a new area of research that crossed disciplinary boundaries. The combination of research in physiology, psychology, statistics, and psychiatry represented another break from the traditional research pattern in narrow fields. Interdisciplinary organized research would be another innovation fostered by the new CNRS. Finally, Laugier's work had made him particularly sensitive to the need for "applied" science. While still maintaining his support for "pure" research (as in his dealings with Lahy), Laugier had a great deal of experience in applying the research results of physiology and psychology to the practical needs of private companies, schools and government agencies.

As substantial as Laugier's scientific work was by the time of his new appointments in 1937, there are still questions remaining as to why he was picked to head the Service nationale and subsequently the CNRS. To be sure, there were eyebrows raised because of his lack of scientific stature compared to other French scientists of the day, but there was no open dispute about the appointment at the time or question about Laugier's efficacy while he held the post. The criticisms seem mostly to have been indirect, stressing the fact that his main qualifications were his political skills rather than his scientific accomplishments⁹⁴. In private, and as time went on, a distortion of the truth occurred which implied that Laugier had few scientific credentials, taught no students and did little scientific research⁹⁵. The reasons for these sentiments may stem from general resentment and suspicion among "universitaires" about the new CNRS, or the low esteem in which biological sciences (let alone physiology or medicine) are held by physicists, chemists and others in the "hard" sciences. Whatever the origin, they can be dismissed as unfounded or false. Laugier most certainly taught courses in conjunction with the Chaire de Physiologie du Travail at CNAM, as well as at INOP. He also taught students at the Sorbonne before he succeeded Lapique there in 1937⁹⁶. And as this study has shown, he definitely conducted research.

The question of the worth of his scientific work is a little more difficult to assess. Laugier himself was not insensitive to some of the rumors, and late in life told an audience that his work

⁹⁴ See, for example, interview with Gabriel Mineur in *Cahiers pour l'histoire du CNRS*, 2 (1989), 37, who otherwise adored Laugier. This is also corroborated in unpublished interviews by Picard with Néel (4 June 1986) and Cremieux-Brilhac (26 June 1986).

⁹⁵ Unpublished interview by Picard with Jean Wyart (March 1986).

⁹⁶ For the testimony of a former student, see *Biologie et développement, mélanges ... en hommage au Professeur Henri Laugier* (Paris: PUF, 1968).

in physiology involved, "des travaux qui furent, je le crois, honorable, très honorable, sans plus; qui n'étaient pas de ces travaux qui aboutissent à des découvertes ouvrant des voies imprévues à des avenir incertains et qui conduisent au Prix Nobel. Ils ne furent même pas de ces travaux qui assurent la grande renommée nationale, académique ou outre. Ils furent seulement des travaux de première seconde classe, poursuivis avec des collaborateurs éminents dont certains ont dépassé aujourd'hui leur maître."⁹⁷ Neither the criticisms nor Laugier's disarming comments took into account his remarkable accomplishments as an organizer of science - a skill different from research and politics but combining the abilities of both. This is, perhaps, his greatest legacy. For he was correct that his specific studies in physiology, docimology, biotypology or psychotechnique are little remembered today. But the journal *Travail humain* continues to publish, as does *Biométrie humaine* (successor to *Biotypologie*); and the Institut National d'Etudes du Travail et d'Orientation Professionnelle continues to function. One could similarly argue that Jean Perrin's greatest legacy to contemporary science was the CNRS rather than his work in physics which was of the "première ordre" and then some. That Laugier knew this is evident at the time of his self-deprecating remarks cited above. For he made them in order to establish his credentials for the real purpose of his speech: a blistering attack on what he called the "mediocre" level of state support for science in France. Even at age 80 and long after leaving the laboratory, Laugier continued his work of science.

⁹⁷ Henri Laugier, *Du civisme national au civisme international* (Paris: Ed. Ophrys, 1972), 116.