SPECIAL PAPERS ON THE HISTORY OF SCIENCE – I

JOHN LEONARD RIDDELL

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I. INTRODUCTION

It is rare that a man combines careers in science and politics. It is more unusual when his scientific achievements cover five distinct fields – medicine, botany, chemistry, geology and physics. John Leonard Riddell was such an unique individual and his place as a leader in science in the deep South during the nineteenth century has been firmly established.

It is doubtful, however, that Riddell will ever be accorded his proper place in the scientific annals of the United States. His work, basic and important, has been superseded by modern refinements and techniques and his publications, although numerous, were confined to a few journals.

Riddell's colorful life, with his passion for all things scientific as its dominant influence, serves as an excellent example of a type non-existent today. In this era of specialization our scientists do not possess the breadth of interest which Riddell and his contemporaries displayed. Nor do we find that adventurous spirit, that eagerness to participate in local cultural, business, and social activities. Few scientists today enjoy the financial success Riddell did.

It is to be regretted that there are no records of his personal life during his most productive years. We would like to know how he became interested in politics, what some of his views were on the major national issues of the time, and how these were developed.

The New Orleans Academy of Sciences, founded by Riddell and others in 1853, remains today a symbol of Riddell's leadership and industry. During his years as president of the Academy, Riddell made the community conscious of the need for such an organization, and laid a firm foundation for its growth and development. Perhaps the community was ready for such an organization, but the driving force was Riddell.

The versatility of John Leonard Riddell – scientist, educator, politician, business man and devoted family man – remains a challenge to young scientists today.

In preparing this manuscript the author has had access to the diaries of John Leonard Riddell, on deposit in the Howard-Tilton Memorial Library, Tulane University, New Orleans, Louisiana. Permission to use these diaries was granted by their owner, Mrs. Jefferson Davis Riddell. They have been

Figure 1. John Leonard Riddell, circa 1855 (courtesy, Rudolph Matas Medical Library, Tulane University).

an invaluable source of details which have been used to supplement the meager biographical sketches which have been published. Permission to reproduce certain illustrations was granted by the Louisiana State Museum (frontispiece), the Rudolph Matas Medical Library of Tulane University, the United States Army Medical Museum, and the New York Public Library.

II. FAMILY HISTORY

The Riddells traced their family ancestry from the Barony of Riddell and Lilerclive in Scotland in the Eighth Century. Robert Riddell, great-grandfather of John Leonard Riddell, was born in Coleraine, Londonderry County, Northern Ireland in 1713, and emigrated to New England in 1737. Robert married Mary Thompson, and their son Gawn was born in Londonderry, New Hampshire on February 22, 1753. Gawn married Margaret Taggart, also of Londonderry. John, the son of Gawn and Margaret, was born in Colerain, Massachusetts, December 15, 1783. John was educated at Deerfield Academy, and became a school teacher, constable, justice of the peace, and a captain of militia. He was tall and slim, with light blue eyes and dark hair.

John married Lephe Gates of Leyden, Massachusetts, the daughter of Peter and Mary (Molly) Allen Gates. The young couple was living with the Gates family in Leyden at the time John Leonard Riddell was born, on February 20, 1807. John Leonard was the first of a family of ten children. Family records tell us that Lephe Riddell was dangerously ill for some months following John Leonard's birth, forcing the family to remain in Leyden until she was completely well. John and Lephe then moved to the paternal homestead in Colerain, Massachusetts, where they remained for a brief time.

Before John Leonard's first birthday the family moved to New York State, settling on a farm near Preston, in Chenango County. John Riddell had expected financial aid from his father Gawn, but this was not forthcoming. Even at the death of Gawn Riddell (1812) his son did not benefit financially, the property falling into other hands. As a result the transplanted family led a struggling existence for many years. They lived in a small bark-covered log house, in the center of their farm. It was surrounded

> "by a wilderness, but . . . near an excellent fountain of water."
>
> *Personal Journal,* vol. 10

John Leonard Riddell's formal education began at the age of four. He attended a school kept by Polly Chase at the Corners, a mile distant from his home. He noted in his *Journal* that he

> "learned all the letters but 'm'."
>
> *Personal Journal,* vol. 10

He did not attend school during 1812, but was given "pious instruction," with hymn singing, under the supervision of his mother. During the next five years he attended the district school for short sessions in the summer and a few weeks each winter. Among his teachers were his aunt, Anna Gates, and his uncle, Nathan Noyes. He recalled that he became an excellent speller, and read the *Columbian Reader,* the *American Preceptor* and Smith's *Geography*. However he observed that he did not learn to write until he was twelve. He began the study of grammar in 1820, but did not really accomplish anything for several years. His studies did not include arithmetic until 1823. A year later he began Latin, reciting once a week to a Presbyterian clergyman in the neighborhood, and at the same time he continued his own reading in mathematics.

His interest in things scientific began in 1821, while he was supposed to be a student at his uncle's school. For one month out of the three month term he did not attend

> "for I got offended,"
>
> *Personal Journal,* vol. 10

and spent that month reading Spafford's *General Geography*. This text contained some elementary astronomy, chemistry and natural philosophy (physics), which were

> ". . . entirely new to me and which absorbed my whole attention. I resolved to become a philosopher, and forthwith set my ingenuity on the alert. . ."
>
> *Personal Journal,* vol. 10

Riddell's favorite instructor was John Brown, the schoolmaster in 1822. Brown, a student of medicine, was apparently a very good teacher, for he left a strong and excellent impression on young Riddell. Throughout these early years Riddell preferred to read on his own, rather than attend formal classes, such as they were. His reading was not confined to any particular field, and was quite extensive.

In 1825 Riddell attended the "Select School" of Mr. Sayre for three weeks, concentrating on algebra, and reading Ferguson's *Astronomy* in his spare time. After such varied and interrupted sessions he enrolled at Oxford Academy for four months (1826), studying under Rev. Mr. Andrus. Riddell wrote in his *Journal:*

> "My early opportunities for acquiring education were far from being superior. Until I was more than seventeen years of age I never saw the interior of a more dignified edifice devoted to learning than a common schoolhouse."
>
> *Personal Journal,* vol. 10

During part of each summer John Leonard was obliged to aid his father on the farm. This was extremely distasteful to him, and he records in his *Journal* that he received frequent floggings for his laziness, but

> "floggings only made me worse."
>
> *Personal Journal,* vol. 10

His first job was as mail carrier, on horseback, from Norwich, New York to Cortland, New York (1824). When he was eighteen (1825) he was appointed schoolmaster at Solon, Cortland County, New York, and received $7.00 a month for a three month term. He must have been successful, for the next year Lawyer Brush, father of one of his students, sent a special messenger to engage him to keep school in Truxton, New York at the increased salary of $10.00 per month.

One of the few intimate friends Riddell had was Randolph Williams, a boyhood chum who lived near him at Preston, New York. Williams, a slightly lame lad, was mischievous and the possessor of a daring and reckless disposition which matched Riddell's. In his later years Riddell remembered with much pleasure shady walks,

> ". . . orchards and plum yards of honest farmers so sadly subject to our nocturnal depredations,"
>
> *Personal Journal,* vol. 2

miniature gang warfare, midnight turkey roasts with stolen turkeys, and many imaginary ramblings and flights of fancy. The two boys traveled over the world together, investigating out of the way places. The source of the Niger River was, for some reason, of particular interest, and was referred to many times in later years by Riddell. Perhaps the whole friendship with Williams is best summarized by Riddell's phrase

> "his heart beats in unison with mine."
>
> *Personal Journal,* vol. 2

After his brief stay at Oxford Academy, Riddell spent two terms at Rensselaer School in Troy, New York, where he studied under the celebrated scientist Amos Eaton. His *Repository* contains classroom notes on courses in geology and botany, as well as lists of chemical apparatus and chemical formulae, which he termed "recipes." He received the Bachelor of Arts degree from Rensselaer in 1829.

Several years earlier (1826) Amos Eaton had provided for a Master of Arts degree, with the stipulations:

> "After the expiration of three years from the date of the aforesaid degree A.B. . . . if it is made to appear that he has sustained good moral character, and has continued to advance in the pursuits of scientific knowledge, he will be admitted to the second Rensselaer degree, to be denominated Master of Arts in Rensselaer School . . . it is intended to imply that his experience in the application of science to the arts, has qualified him in a higher degree to take charge of the instruction of others, and to give profitable counsel to the artist and to the agriculturist."
>
> *Rensselaer Rev. of Grad. Studies,* 1957, vol. 3, p. 4

Riddell applied for the Master of Arts while at Marietta, Ohio in 1832, and was duly awarded the degree. The charges for the degree were listed as $4.50.

Riddell's first scientific lecture was given on August 16, 1829, to the Rensselaer students, entitled "A New Theory of the Earth." In this talk he discussed the various geological formations found on the earth, and attempted to link these to the existence

and types of fossil remains found with these formations. He believed that originally the globe was covered with water, and that the earth was formed by

> "revolutions as a result of submarine fires and reactions of combustible materials buried beneath the ocean."
>
> *Repository,* vol. 1

After his graduation from Rensselaer, Riddell returned home and advertised for students for his own "Select School." The following notice was inserted in the Norwich, New York, newspaper, March 17, 1830:

> "Select School"
>
> "Mr. J.L.Riddell a graduate of Rensselaer School proposes to open a Select School in this Village on the 29th of March inst. in which will be taught the branches usually required. The School will be pleasantly situated in the south street.
>
> "For orthography and reading, per quarter $2.00
> Writing and first lessons in arithmetic and grammar 2.25
> Arithmetic, grammar and geography .. 2.50
> History, drawing maps and surveying .. 3.00
> Higher branches 3.50
>
> "Extra expences, eighteen pence per scholar. Mr. Riddell can assure parents and guardians that the moral as well as mental improvement of those committed to his care, will receive strict attention."
>
> *Repository,* vol. 2

But the job of a district schoolmaster did not appeal to the young scientist. After one term he decided to earn his livelihood as a traveling lecturer in chemistry.

III. PERSONAL CHARACTERISTICS

Facts about Riddell's personal life and character can only be pieced together from fragmentary sources. We are told that he was extremely good-looking, with rosy cheeks and a delicate skin. He had high cheek bones, a Riddell family characteristic. He was endowed with a certain amount of charm, pleasing manners, and a large proportion of ego.

Riddell had the unfortunate habit of captivating young women, beginning in his early years, when he noted his first love affair with Emeline Brown (1822). Emeline was an

> "exceedingly pretty black-eyed miss and the daughter of a black smith."
>
> *Personal Journal,* vol. 10

He also fell in love with one of his first pupils, Sarah Ann Hawley (1825). These were but the initial events in a long chain of affairs, some petty and some serious, which continued even after his marriage in 1836. These affairs frequently went beyond the bounds of propriety, and caused him to lose favor in several communities.

In his adult years Riddell was termed an eccentric, always outspoken and pompous, extremely cynical, and eager for personal improvement. He wrote and spoke in a manner designed to produce an effect, using words and phrases frequently ill-suited to the topic at hand, but capable of creating the impression of grandeur. His own summation of his adult behavior seems to fit perfectly:

> "I conduct myself with considerable reserve and hauteur."
>
> *Personal Journal,* vol. 1

Riddell kept a *Personal Journal* beginning with his graduation from Rensselaer, and continuing until 1849. In later years he recorded his family genealogy and some facts about his early life. He also kept a *Repository,* a record of scientific problems, inventions, notes on lectures, theories and sketches of apparatus, and many miscellaneous jottings. For a short time he also kept a *Depository,* consisting of bits of poetry and prose. Most of these have a spicy tinge. The existing volumes of these three journals are deposited in the Howard-Tilton Memorial Library of the Tulane University of Louisiana, New Orleans, Louisiana.

Riddell's *Repositories* and *Journals* are filled with incomplete sketches, diagrams, descriptions and speculations on all sorts of subjects. Only a few of these were ever completed, or even described in such fashion that they could be followed. A few comments on some of these will be given.

Museum Specimens.

Riddell suggested the injection of a low fusing point alloy into the arteries of ani-

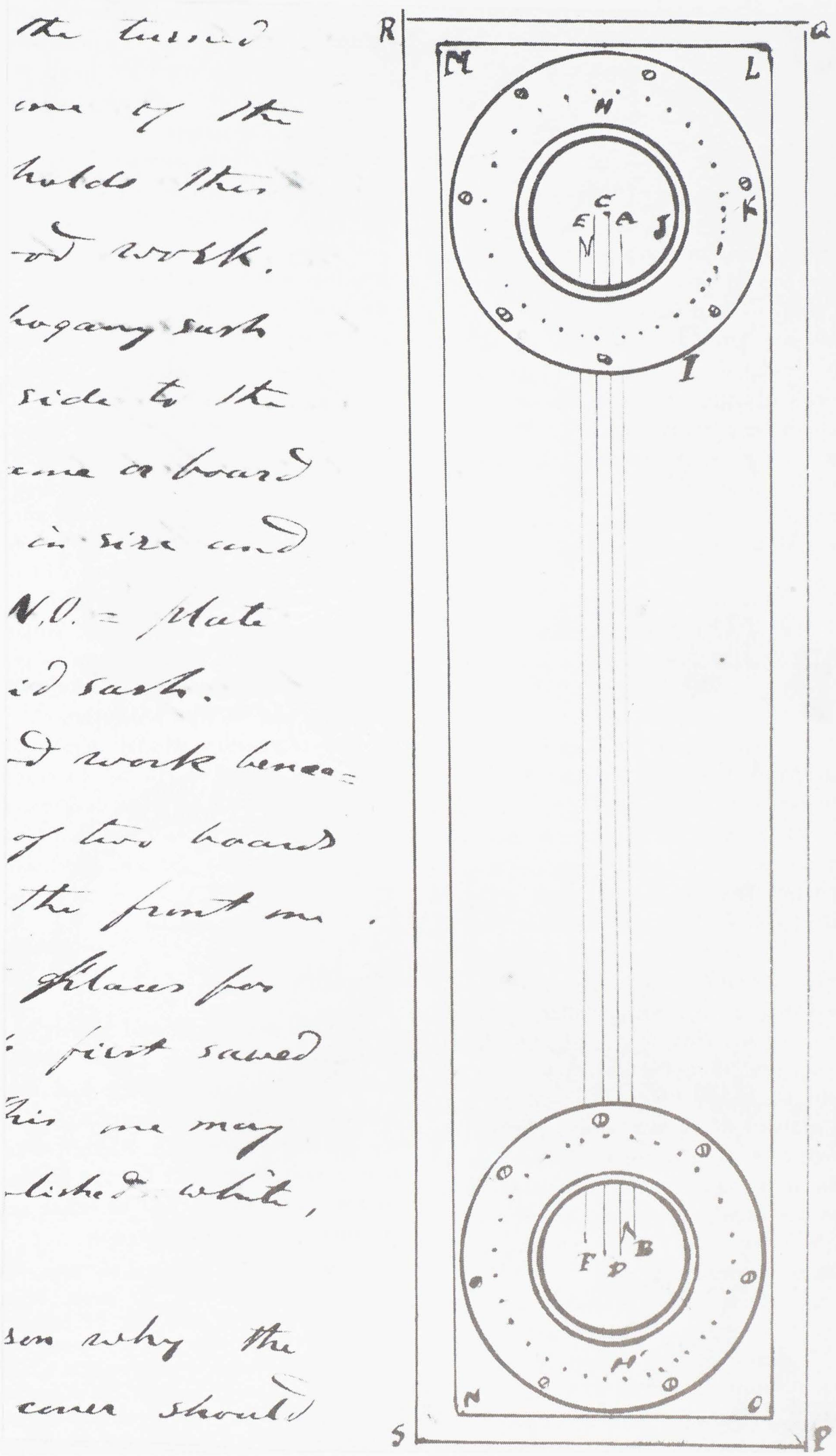


Figure 2. Page from one of Riddell's Personal Journals (Howard-Tilton Memorial Library, Tulane University).

mals, then, after hardening, the removal of the organic matter. The shaped alloy remaining could be placed in a glass case for display purposes.

Recipes.

His early *Journals* (1829,1830) contain "recipes" or directions for making various substances. Most of these were not original, but were copied from his reading. The interesting thing is the variety of topics which attracted him enough to be inserted into the *Journal:* notes on cements and lutes; directions for silvering mirrors; directions for producing fire; composition of rockets; composition of glass; soft glass for jewelry; spruce beer powders; soda powders; lemonade powders; notes on removal of stains; matches and percussion powders.

IV. EARLY LECTURES – OGDENSBURG AND BROCKVILLE 1830-1831

John Leonard Riddell's early lectures in chemistry and in botany consisted of basic fundamentals obtained from Amos Eaton's lectures at Rensselaer and from his own reading. There was very little original material in them. The first series was given in Ogdenburg, New York, in the fall of 1830. He was well received in Ogdensburg and in Brockville, Ontario, Canada, but he barely made a living. It was his practice to solicit letters of introduction to prominent citizens in a town, and then call on these men and ask them to sponsor his series of lectures. Riddell seemed to feel that it was natural for him to receive such sponsorship even if he was a total stranger to the men concerned. When he was unable to secure the support he sought he was quite indignant and often bitter, as his records indicate.

Riddell had purchased sufficient scientific apparatus for his lectures, and entered each item in Volume 1 of his *Repository.* The total expenditure was about $25.00. His first series in Ogdensburg netted a profit of $38.32, (January, 1831). In addition to his series of lectures in chemistry he planned a series of botanical lectures in an attempt to support himself in a more substantial fashion. He also tried his hand at chemical analysis, devising a gravimetric method for analyzing a specimen of potash, but was not paid for his efforts as he had expected.

During this period Riddell contemplated writing a "popular and systematic botany" and compiling a series of florae. He was also reading medical textbooks and collecting minerals and plants. Riddell's *Repositories* are filled with detailed descriptions of formations, locations of ores, mineral springs, natural waters, etc. encountered on his many field trips. He wrote a paper on the geology of the St. Lawrence region, but did not publish it. His reports are characterized by general descriptions, substantiated by personal references and conversations with the inhabitants of the region. His non-scientific reading included Byron; Cervantes's *Don Quixote;* Johnson's *Rasselas;* Blair's *Harmony of Sentences, Lectures on Modern Eloquence* and *Lectures on Style;* Scott's *Waverly;* and Homer's *Odyssey.*

For recreation Riddell took long walks along the banks of the St. Lawrence River, frequently alone, but occasionally in the company of his friend Marsh or some congenial young lady. He practiced fencing and the

> "broad sword exercise,"
>
> *Personal Journal,* vol. 1

and played billards and whist.

Riddell and his friend Marsh had an extended discussion on a new theory of the solar system which Marsh had postulated. What the exact principles of the theory were we do not know, but Riddell was certain that it would account for the motion of the planets, but would fail in other areas. According to the Riddell version,

> "the earth is not directly attracted to the sun's center, but to some other point. Wherefor the direction of the centripetal force which arises from the sun's attraction varies from the direction of the other force. If these suppositions were established we should infer that there was a constant impulse arising from the rotation of the sun that acted to impel the earth forward in its orbit."
>
> *Personal Journal,* vol. 1

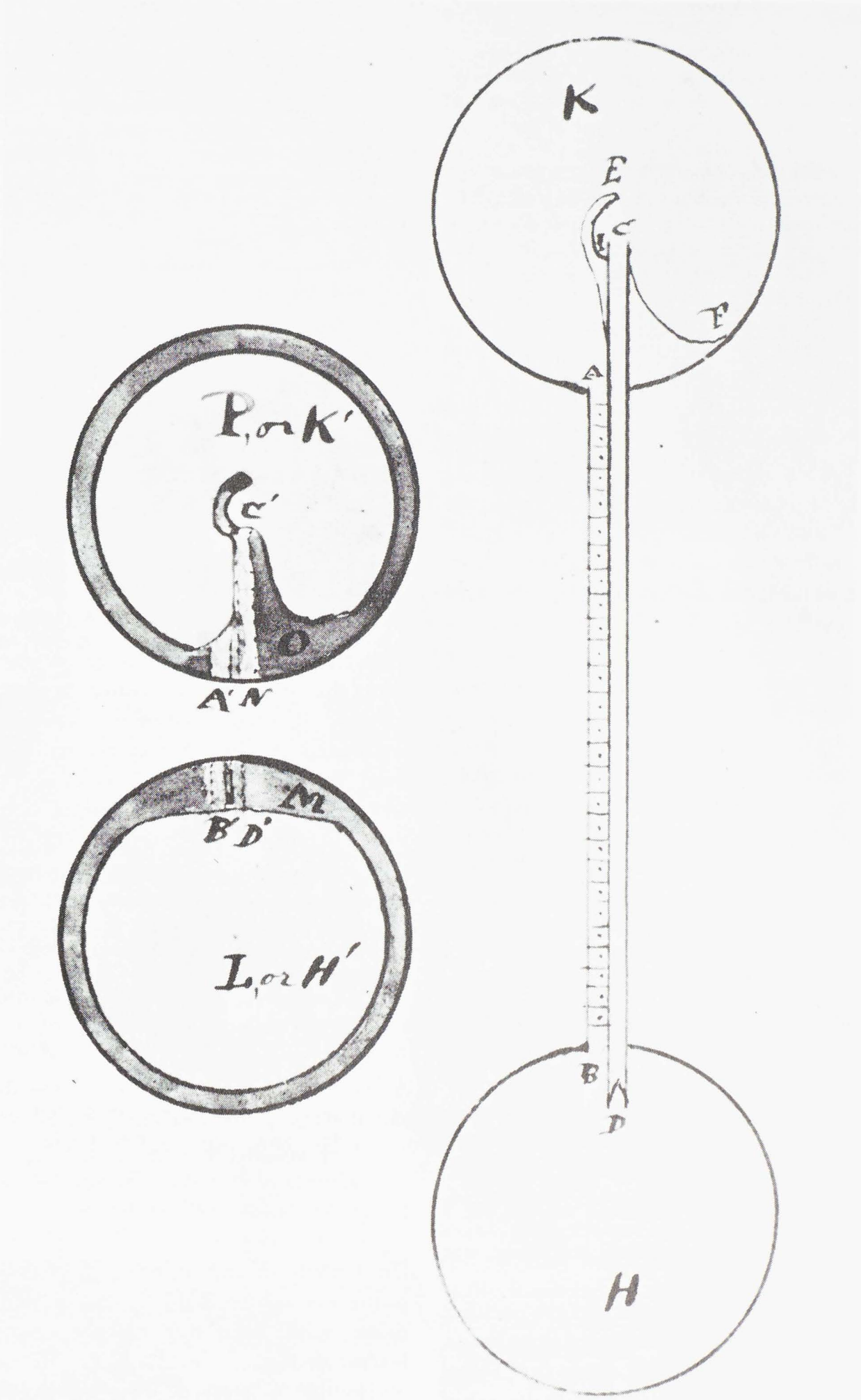


Figure 3. Drawing of Riddell's modification of the barometer, as given in his *Personal Journal* (Howard-Tilton Memorial Library, Tulane University).

Riddell considered the following analogy for the planets:

> "Planet is in the condition of a boat drawn on water by two ropes, pulling at an angle so obtuse as to seem in a line. Yet the angle of the ropes always remains the same. In the same manner the motion of the earth is kept up by the joint action of centrifugal and centripetal forces that vary little in direction. The centrifugal arises of course from the curvilinear motion of the earth in its orbit, and as the earth would fly off in a tangent to its orbit the center of which is the center of the sun, if this force alone existed it may be inferred that the direction of the centrifugal force is from the sun's center."
>
> *Personal Journal,* vol. 1

One of his amorous affairs in Ogdensburg probably turned some of the more staid citizens against him, for when Riddell wanted to borrow some scientific apparatus for lectures in Brockville he was promptly refused. He did secure some letters of introduction, and later traveled from Ogdensburg to Prescott to Brockville.

While in Ogdensburg he made a decision of importance, one which certainly influenced his future. He had to choose between accepting a full time teaching position in Ogdensburg, continuing his lecturing, establishing a school of his own, or returning home and studying medicine by himself. Since he was in financial straits, and could not call on his family for assistance, the last two alternatives were not feasible. He was not particularly interested in teaching because of his early experiences, for he wrote.

> "O Heavens, for my existence sake, deliver me from the thankless task of teaching a room full of hard-headed, thick-pated, mischief-making boys!"
>
> *Personal Journal,* vol. 1

So the decision to continue lecturing was inevitable.

His diary contains many bits of peculiar poetry and many indications of loneliness. Riddell was not accepted into the social circles in Ogdensburg, or in any of the other towns he visited, as he desired.

> "Untoward circumstances, yes poverty, unrelenting poverty, now oppose an insurmountable barrier to my advancement. I was fired by ambition and vainly hoped to redeem an empty name from that bottomless gulf of oblivion into whose dark waters is whelmed the memory [of] the mass of human beings. Paralyzed by the influence of sad experience, should I now be set back to the years of my childhood, I would not aspire to raise myself above the level of contented insignificance."
>
> *Personal Journal,* vol. 1

Although he was in financial straits, Riddell bought

> "two pairs of fashionable white pantaloons and two linen shirts with plain bosom,"
>
> *Personal Journal,* vol. 1

on credit, because he felt he should be seen in proper attire.

Riddell left Ogdensburg on June 8, 1831, traveling by boat to Morristown, New York, where he had an argument with the captain over the charge for his passage. Riddell commented

> "I would have given half a kingdom for a sword or a dirk. . .,"
>
> *Personal Journal,* vol. 1

with the result that his baggage was spilled over the dock. Commandeering a wheelbarrow, Riddell loaded his property and proceeded to the nearest tavern. He ferried from Morristown to Brockville, but this, his second visit, was not as pleasant as his first. The attitude of the citizenry was hostile, due to a widely publicized love affair with a Mrs. Crawford, daughter of the Sheriff, during his first visit. Riddell noted that Mrs. Crawford was

> "young, sprightly, dark-eyed and very pretty."
>
> *Personal Journal,* vol. 1

At two or three tea parties at her home, in the absence of her husband,

> "she behaved very indiscreetly and I could scarcely do less . . . I believe we both fell seriously and painfully in love."
>
> *Personal Journal,* vol. 1

Dr. Crawford, the husband in question, was polite enough to Riddell, and invited him to drink with him, but openly opposed his lecture series.

He had a letter of introduction to Archdeacon G. O. Stewart, who received him coolly at first, but later gave him a letter and support. A clipping from the Brockville newspaper announcing his lectures bears the signatures of the Archdeacon and of B.

Bidwell, another well known citizen. His diary notes that

> "I have a high idea of the virtue, integrity and benevolence of the clergy. . .,"
>
> *Personal Journal,* vol. 1

a statement which he refuted on other occasions. In spite of the endorsements the second lecture series at Brockville did not materialize, so Riddell moved on to Kingston, Ontario.

V. WANDERINGS – 1831-1832

During the first week after his arrival in Kingston Riddell called on those citizens to whom he had letters of introduction, solicited their sponsorship for his lectures, attended teas and soirées, and was quite careful to remain on good behavior.

> "I must sacrifice my feelings to interests in some cases when I have made a circle of acquaintances I feel impelled by pride and honour to support by rank. . ."
>
> *Personal Journal,* vol. 2

The first lecture was given on June 19, 1831. The editor of the Kingston *Patriot* commented favorably:

> "Riddell is quite a young man, but evidently master of his subject, and abundantly able to illustrate it by numerous interesting and instructive experiments, for which he is provided with neat and compact apparatus. The youth of Mr. Riddell, we consider, greatly to strengthen his claim to encouragement and support, for a spirit of emulation is invariably the fruit of nurturing the splendid results of early and unwearied application to the sciences."
>
> *Personal Journal,* vol. 2

A full prospectus describing his lectures was prepared by Riddell and appeared in the Kingston *Herald,* June 22, 1831.

> "Mr. Riddell, being a lover of the natural sciences, adopts the means of making a sort of Linnean pilgramage through the Canadas. The wild productions of the forest and the varied subjects of the mineral kingdom are what he wishes to become acquainted with. And he knows of no avocation that would afford greater facilities to the pursuit of his favorite subject than that of an errant lecturer on chemistry."
>
> *Personal Journal,* vol. 2

Topics included in the proposed course were:

> "The cause of heat. The various natural phenomena produced by that subtile agent. Divers methods of producing heat spontaneously and of causing a degree of cold sufficiently intense to freeze water in a warm room. Electrical experiments with the several theories and doctrines of electricity. Proximate cause of lightning. Reasons why its course is sometimes forked or angular. Relation of light and heat. General view of attraction. Affinity, the foundation of chemical science. Atomic propositions. Scale of equivalents.
>
> "Note: the department of pneumatic chemistry will be but very little abridged. The elementary supporters of combustion and the simple non-metallic substances will all be duly considered and their properties faithfully illustrated with experiments.
>
> *Personal Journal,* vol. 2

The following experiments were planned:

> "Burning iron wire in a vessel of oxygen gas; burning phosphorus in a vessel of oxygen gas; bleaching prospect of chlorine; combustion of a brass wire and other substances in that gas; experiments with iodine; art of etching glass with fluorospar; experiments with hydrogen – philosopher's candle, musical sounds, strange effects of platina sponge; pneumatic balloons; aerial navigation. Analytick and synthetick composition of water. Nature and properties; composition of the atmosphere; properties of nitrogen. Nitrous oxid or exhilarating gas. Nitrogen compounds. Sulfur and its compounds. The mephitic air that charges the water of many springs. Experiments with phosphorus. Charcoal. Choke damp of mines. Limestone composition. Inflammable hydrocarburets; inflammable gas burned in cities, etc."
>
> *Personal Journal,* vol. 2

This prospectus for a series of twelve to fifteen lectures was indeed ambitious. Many of the topics proposed for discussion are in the realm of physics, while the experiments are strictly chemical. Riddell's careful technique of demonstration, tending toward the spectacular, and his detailed explanations, made his lectures much appreciated by the scientists in the audiences, and enjoyed by the general public. The cost of the series was twenty shillings for one ticket; one pound, ten shillings for two tickets; two pounds, five shillings for a family ticket; or two shillings, sixpence for a single lecture.

On June 25, 1831, he noted in his *Journal* that he had left Norwich and school

teaching one year, and somewhat bitterly remarks that

> "I have witnessed a variety of scenes, passed through novel adventures, and seen various shades of human character, etc. which, with my former experience, serve to confirm the truth that the best friend a young man has in a strange land is his own dear self."
>
> *Personal Journal*, vol. 2

He was homesick and lonesome, and often wished that he

> "had his apparatus off his hands,"

and

> ". . . a less disagreeable way of obtaining a livelihood."
>
> *Personal Journal*, vol. 2

Perhaps the most important acquaintance Riddell made while in Kingston was William LeConte, the eminent naturalist. He made several field trips with LeConte, and had many discussions with him on scientific subjects. Riddell proposed a type of symbolic shorthand for presenting botanical descriptions and asked LeConte to support him. LeConte thought that such a scheme might be desirable, but that it was certainly impracticable.

While in Kingston Riddell read Spencer's *Faerie Queene,* Shakespeare's *Julius Caesar* and *Macbeth,* and A. F. deFourcroy's *Chemistry.* During this period he again evidenced much interest in the study of medicine, listing desirable books for a medical library in his diary. These included Charles Bell's *Anatomy;* Bell's *Nervous System;* Samuel Cooper's *Surgery;* Bell's *Operative Surgery;* Magendie's *Elements of Physiology;* Eberle's *Materia Medica;* James Burns's *Obstetrics;* Gregory's *Practice of Medicine;* the *American Pharmacopeia;* Webster's *Manual of Chemistry;* Chapman's *Practice of Medicine;* Hooper's *Medical Dictionary;* and a few others. Some of these texts are regarded as medical classics today.

The itinerant lecturer traveled from Kingston to York (now Toronto) and then to Erie, Meadville and Pittsburgh, Pennsylvania and Wheeling, West Virginia. At Erie he lectured at the Courthouse on "Geology and Mineralogy," November 17, 1831. This was the first public lecture in this field. At Meadville, Riddell's baggage fell into the river, damaging his books and his apparatus. He instituted legal proceedings to recover damages, but there is no record of success.

Riddell's general concept of science is given in a note prefacing a lecture given at Meadville, Pennsylvania, in 1832. He divided Natural Science into Natural Philosophy (Physics), Natural History, and Chemistry. He felt that it was impossible to

> "draw the line of demarcation between them and say where one science ends and another begins.
>
> "Natural history considers the infinitely varied productions of nature, as they are left by the operation of nature's laws or the hands of the original Creator. Hence the natural historian makes himself acquainted with the habits and appearances of animals, plants and lifeless minerals, and these he studies in their native condition, disregarding the changes effected by the art and ingenuity of man.
>
> "Natural philosophy investigates and explains the properties, motions and relations of material bodies, without any regard to their inherent composition. It is the laws of nature, developed by natural philosophy; that poise the heavenly bodies and direct the distant planets in their trackless orbits through the regions of empty space. . .
>
> "It is the province of chemistry to seek out the elements of matter, which in their varied combinations assume appearances so widely different and to investigate the nature and cause of the numerous changes to which they are liable.
>
> "Both chemistry and natural philosophy investigate the laws of inorganic matter. But they differ in this: that natural philosophy explains the perceptible motions of natural bodies in mass, such as the momentum of falling bodies, the pressure of fluids, and the force and effects of planetary attraction, whereas chemistry considers the insensible motions incident to the elementary atoms of which these bodies are composed, such as the solution of sugar in water, the formation of clouds, and the slow decay of organic matter."
>
> *Personal Journal,* vol. 5

His definitions of the sciences follow the usual pattern of the times, but the pharseology in the last paragraph is genuine Riddell. He referred continually to momentum and to the planets, often erroneously.

On arrival in Pittsburgh Riddell boarded at Mrs. Reynolds's for $3.00 per week, provided that he make his own fire. Again his

youthful instincts led him into difficulty, for Mrs. Reynolds asked him to leave after a short stay. His initial gratuitous lecture was given on February 20, 1832, in the Grand Jury Room. A second lecture, on "Chemistry and its Application to the Arts and Manufactures" was given on the following day. He was unable to secure sufficient subscriptions for his course of lectures, but did engage in many discussions on scientific subjects, principally with Dr. Bruce, president of the Western University of Pennsylvania. Their discussion concerned

> "the ratio in which air or other fluids would impede a body moving with different degree of velocity."
>
> *Personal Journal,* vol. 4

Bruce maintained that

> "the obstruction of air was directly as the square of the velocity,"
>
> *Personal Journal,* vol. 4

but Riddell remarked

> "now though that is undoubtedly incorrect I will make some calculations thereupon."
>
> *Personal Journal,* vol. 4

And then he proceeded to calculate for four pages, deriving a complex formula for the velocity of particles moving through a resisting medium in terms of the diameter of the particle.

Later he changed his opinion and accepted the proportionality Bruce stated, for in some of his aerial calculations he lists the following three assumptions:

> "Resistance of medium proportional to v^2 of moving body.
> "A cylinder moving endwise through a resisting fluid encounters four times the resistance of a sphere of the same diameter and moving with the same velocity;
> A spherical drop of rain of 1/10 inch in diameter would have, in falling through air, a terminal velocity of 10.48 ft/sec."
>
> *Personal Journal,* not numbered.

Riddell also noted at least three amorous adventures while in Pittsburgh, describing these in wistful terms.

Riddell traveled by river boat down the Ohio River to Wheeling, West Virginia, arriving on April 30, 1832. He registered at the Wheeling House, paying $4.00 per week. He duly noted that he was being overcharged, since most of the other boarders paid only $3.00. He was successful in securing subscribers for his lectures, which began on May 9 in the Masonic Hall. His fees for the series were $5.00 single, $7.00 couple and $10.00 per family, for fifteen lectures.

On May 20 he moved to Washington Hall, with William B. King as landlord. It was at Washington Hall that one of the unfortunate occurrences of his early life took place. Riddell attempted to seduce one of the chambermaids in the boarding house, but another maid discovered them and notified King. Riddell was obliged to leave, not only the house, but the town, because of the magnitude of the story which was circulated. A Dr. Townsend came to Riddell's defense, but none of the newspapers would print anything of the affair. In spite of the adverse publicity because of the incident, the Wheeling lectures were quite successful.

Perhaps the most interesting acquaintance made at Wheeling was the subject of the following paragraph:

> "Met with eccentric old schoolmaster whose mental faculties are strangely organized. His name is Hildreth. The citizens all believe him bordering on insanity. He seems indeed to suffer under a kind of mental alienation or rather perversion, but I have little doubt it has its origin from the intense zeal with which he pursues a few delusive theories which have sprouted in his own brain. He has observed a universal key to all knowledge and science, whether moral, philosophical, natural or supernatural."
>
> *Personal Journal,* vol. 4

From Wheeling, Riddell journeyed to Marietta, Ohio, and became a

> "temporary professor of astronomy, geology, botany and chemistry at the female seminary in Marietta. . .,"
>
> *Personal Journal,* vol. 4

for which he taught three hours a day, and gave lectures twice a month, for a salary of $30.00 a month.

VI. MARIETTA – 1832

Riddell's *Journal* places him in Marietta, Ohio, on June 25, 1832, living with the very religious family of the Widow Robins. His room and board amounted to only $1.00 a week, but he complained about the food, and lived mostly on milk and bread. Once a

week the boarders were served fresh meat. Pork and butter were available more frequently, but Riddell did not care for them.

In his early wanderings he had made occasional references to religion and to church attendance, but it was in Marietta that he took occasion to enter his comments at length. He wrote

> "We live upon the Holy Scriptures, family prayers and very plain food . . . I should not be popular among them if I remain, because they cannot sympathize with my unregenerated state. I become more and more of a hypocrite the longer I live, when several years younger I had spurned the idea of redeeming mankind so I hide my real sentiments by silence . . . We are all religious here."
>
> *Personal Journal,* vol. 5

Household prayers were part of the daily routine, and they irritated Riddell considerably. He complained:

> "O! I am tired with and of these long prayers!"
>
> *Personal Journal,* vol. 5

Riddell had some religious training under his mother, but in his adult years he became a free thinker. He did not belong to any particular denomination, yet while lecturing he attended church quite regularly. He would visit with one congregation for the morning service, and another for the evening service. He looked upon church services primarily as an opportunity to meet some of his young ladies or to exchange amorous glances, or to visit with some of his patrons. He had little regard for the preachers or their sermons, although he counted them among his patrons on many occasions. Riddell believed in God, there is no doubt of that, but he was not able to accept all of the doctrines of any particular sect. On one occasion (1831) he noted that he had never attended a Catholic church, so he went once, and then devoted several pages of his *Journal* to comments on the service. The Mass reminded him of magic hocus-pocus, linked with conjuring spirits from the deep. Perhaps he was a bit bitter on that occasion, because he indicated, with sarcasm, that he was not invited to sit in one of the family pews, but was forced to sit in the gallery. In spite of his interest as it was in religion, Riddell frequently went on a country ramble instead of attending church.

At Marietta he realized that he would gain greater support for his lectures if he

> "attached himself to one of the powerful Christian denominations . . . but I have fancied myself mentally above those fabrics of superstition and I prefer the credit of an independent mind and honest sentiment which have some foundation in reason, to the temporary advantages arising from hypocrisy."
>
> *Personal Journal,* vol. 5

And somewhat later he concludes

> ". . . it really seems to be that the leading features of the Christian creed are absurd to the last degree . . . what is Christianity but a huge fabric of polytheism and idolatry?"
>
> *Personal Journal,* vol. 5

Obviously he was not temperamentally suited for a religious environment, and did not enjoy his stay in Marietta.

The days at Marietta did bring about a change in his emotional state. Perhaps this change was due to the Wheeling incident, for he mentions only one amorous situation while at Marietta, with Hannah, the daughter of the Widow Robins.

> "I fancy we shall fall moderately in love in the course of the week. . ."
>
> *Personal Journal,* vol. 5

After random sentiments about persisting in celibacy, he outlined his thoughts on marriage, which are indeed characteristic, and fit his temperament and disposition perfectly.

> "If by an honourable marriage with an agreeable female I can materially improve my prospects and better my worldly conditions, if I can possess myself of competence and connect myself with highly respectable families, I will certainly adopt the matrimonial state. But marriage under other circumstances will but cut short my agreeable wanderings and fetter my cherished schemes of ambition."
>
> *Personal Journal,* vol. 5

This is quite a change from his early point of view, when he contemplated marriage solely for companionship and relief from loneliness.

While in Marietta he had the opportunity to collect many specimens, and exchanged various plants with Constantine Samuel Rafinesque and other botanists. Although he was not too happy he was quite successful in his scientific work.

> "The Lyceum in this place, with several private individuals, have made up a subscription of $73.70 to have me examine the wild plants which grow about here."
>
> *Personal Journal,* vol. 4

This was, of course, in addition to the fees received from his teaching and from his lectures.

But the young scientist was still uncertain about his future. Every letter from his family in Preston, New York, would evoke some reminiscent jottings in his *Journal.*

> "My boyish comrades are plodding on the same old homely sober path, content to see as little of the world as their fathers. . ."
>
> *Personal Journal,* vol. 5

He would like to renew acquaintances with some of his old friends, particularly Randolph Williams, but

> "I am confident I could not enjoy their company as well as formerly. Therefore I cannot let the recollections of old times controul my better interests."
>
> *Personal Journal,* vol. 5

One of his loyal friends at Marietta was Dr. Samuel Prescott Hildreth. Dr. Hildreth was an individual of considerable influence among contemporary scientists, and was most helpful to Riddell. The two carried on an extensive correspondence for many years. It is unlikely that this is the same Hildreth referred to in the Wheeling quotation.

An important change in Riddell's scientific work occurred in Marietta. The emphasis shifted from chemistry to botany. His interest in botany stemmed from his student days in Rensselaer. His notebooks are filled with references to collecting, exchanging of specimens, directions for preservation of specimens and the preparation of catalogues. He began his own herbarium in 1830.

For example, he was careful to direct that only an oil-cloth bag be used to collect specimens, and that a special type of portfolio be used for carrying specimens. He recommended a 10 x 16 inch portfolio, containing about three hundred pages of

> "soft, bibulous paper"
>
> *Repository,* vol. 5

in covers, with the back cover twice as thick as the front. He designed a special shoulder strap and attachment for the portfolio. Detailed directions for the proper use of the portfolio and for preparing herbaria are given in several places in the early *Repositories.*

Riddell's first botanical paper was printed in the Marietta, Ohio, *Western Republican* on September 1 and 7, 1832, entitled "Notice of the vegetable productions growing spontaneously in Washington County, Ohio." The paper was addressed to the Marietta Lyceum, and in it he employed the catalog system of Jussieu. On July 6, 1832, he had inserted in the same newspaper a preliminary accouncement of the paper, and solicited customers for herbaria. He also prepared a manuscript for the Marietta *Friend and Gazette* based on one of his lectures at the Female Seminary, entitled "Vegetable Relationship" (1832) but signed it with a pseudonym, Raymond Lully, Jr. The *Catalogus plantarium Mariettae* was begun in 1832, but there is no record of its publication. Most of the material appears in his later works on Ohio plants.

In many of his botanical projects Riddell expressed his disapproval of the Linnaean system of classification, preferring the modified systems of Amos Eaton, John Lindley or Augustin Pyramus de Candolle. From time to time he inserted glossaries of botanical terms in his notes.

Riddell was always experimenting with new methods for preparing herbaria. He tried a quick drying method based on the insertion of a quicklime sieve between the layers of paper in the drier. He used the lime to keep the air of the herbarium case dry, and

> "therefore no living thing can exist there and no chemical changes can go on.
>
> "My plans consists in wholly abstracting the moisture from the specimen to be preserved, having previously inclosed it in some material impervious to air or moisture in order that the condition of absolute dryness may be perpetually maintained. The dessicative substance which I make use of is unslacked lime."
>
> *Am. Journ. Sci. and Arts,* 1839, vol. 35, p. 338

This method was successfully used on *Asclepias Drakeana* and other flowers. Their colors were not affected by the lime. He also

designed an axle press, and, later, an elaborate drier and preservation cabinet for use in New Orleans, based on a charcoal furnace. His general directions for collecting and preserving were published in the *Western Journal of the Medical and Physical Sciences* (Daniel Drake's Journal) as "Particular directions for collecting and preserving specimens of plants, extracted from an unpublished treatise on practical botany."

Riddell maintained a large and complete herbarium for his own use, as well as a supply of specimens for sale. He advertised "suits of plants" or collections wherever he lectured. His usual price was $3.00 per hundred specimens during his early wanderings, but later this was raised to $4.50. The price was quite reasonable.

VII. WORTHINGTON – 1832-1834

From Marietta, Riddell went to Worthington, Ohio, as professor of chemistry and botany at the Ohio Reformed Medical College. This institution, truly a "reform" school in its theories of medical instruction, had two professors, Dr. Thomas Vaughn Morrow and Dr. Ichabod Jones. These men gave Riddell a chance to attend the first formal lectures of his life in the various branches of medicine.

In December, 1832, Riddell began his lectures at the Lyceum in Worthington. He became acquainted with the members of the Ohio Legislature who were trustees of Ohio Reformed Medical College, and frequently attended sessions of the Legislature in Columbus. He was only moderately pleased with his post at Worthington.

> "If I could modify the title and character of this college I would be willing to remain a year or two."
>
> *Personal Journal,* vol. 7

His *Journal* contains references to field trips, studying the botany and geology of the region, letters to Dr. Hildreth, and some references to his personal life in Worthington. Drs. Morrow and Jones frequently called on him in his room, and they engaged in many discussions. Riddell was bold enough to ask a Mr. Bye, state senator from Marietta, to propose him for membership in the Ohio Historical and Philosophical Society. He was admitted to membership several years later, January 7, 1835. Perhaps the most human aspect of his *Journal* during this winter is his frequent reference to the coldness of the winter and continued bad weather.

Riddell was still looking for a permanent position. He asked Hildreth to communicate with Dr. Daniel Drake in Cincinnati, Ohio, to see whether there was an opening for him there.

Another interesting aspect of the Worthington period was a change in point of view toward religion. This was brought about by Miss Mary Catherine Burr, a

> "slim, handsome, healthy female!
>
> *Personal Journal,* vol. 7

He then proceeded to describe her in medical terms:

> "Pulse full, vigorous and soft; eyes sparkling and occasionally varnished with the lachrymal fluid; tongue clean and moist; cheeks suffused with red; teeth white and hard; epithelium exceedingly tempting. Form rather slim, but finely turned. Temperament decidedly sanguineous."
>
> *Personal Journal,* vol. 7

During the next few months Riddell became infatuated with Miss Burr, so much so that the community regarded them as engaged. Miss Burr, an Episcopalian, had a brother who was the preacher in Worthington, so Riddell attended church four times each Sunday – Sunday School, morning worship, evening service and the meeting of Sunday School teachers. There is no doubt that he was doing this to be near Miss Burr, for he once remarked that if they would separate he would attend only once a Sunday. The young suitor made quite a point of trying to find out just how much Miss Burr was worth. Estimates ranged from $20,000 to $1,000. He even attended temperance meetings and participated in their programs, speaking on the physiological effects of alcohol. His roommate during this period, a Colonel Morrow, was not congenial with the eccentric scientist. There were numerous feuds, but

> "no lives lost though there was some skin broken."
>
> *Personal Journal,* vol. 7

While in Worthington, Riddell was very concerned about his family. He had hoped to be able to send help to them, but found himself unable to do so. He stated frequently that he did not marry because of his family. He was very proud of them and of their potentialities. In his *Journal* we find

> "I have brothers who were formed by nature to be useful, honourable and perhaps distinguished. Sisters have I who might, with a proper education and in proper circumstances, be an ornament to their sex."
>
> *Personal Journal,* vol. 7

John Riddell, father of John Leonard, died in Preston, New York, on May 10, 1833. His eldest son received the news in Worthington on May 29, and was deeply affected. This increased his anxiety for his family. Since his father had been a tenant farmer he wrote immediately to Mr. Guy Richards of New London, Connecticut, the holder of the title to the farm, and asked his indulgence.

> "I trust that you will not oppress them, or drive them from their only home, but allow them to derive a living from the land which my illustrious father has cleared and cultivated with his own hands."
>
> *Personal Journal,* vol. 8

A few days later he wrote:

> "I do feel as if much of the interest in life were gone; for the approval or admiration of my father of what I might do or accomplish would give me more true pleasure than the voice of all the world besides."
>
> *Personal Journal,* vol. 8

Riddell advised his mother to remain on the farm with the children, and not to bind them out to any trades. He then asked her advice on his marriage

> "to a girl, young, handsome and accomplished, with $3,000 in ready money."
>
> *Personal Journal,* vol. 8

Curiously, in this exchange of letters about his father Riddell lapsed into the old spelling of the name, Riddle, which his father apparently used. In another letter he had initially written Riddle, but deleted the last two letters and substituted "ell".

For several months he debated whether or not he should tell Miss Burr about his father's death. He did succeed in finding out that her exact wealth was between $1,000 and $2,000. Miss Burr was much attracted to the young scientist, and eventually told him that she was in love with him. It was after this that he had courage enough to tell her about his father, but then explained that he was unable to ask her to marry him at that time. They parted at the end of March, 1834, when Riddell left Worthington.

On July 25, 1833, Riddell planned a lecture series on the "philosophy of atmosphere and terrestrial changes," which would contain as topics for discussion:

> ". . . attributes of matter; atomic theory; different states of aggregation of the particles of matter; all the more common phenomena produced by caloric; deposition of dew; ascent of vapour; formation of clouds, rain, hail, snow; cause of winds; meteors (which will involve electricity) . . . nature and composition of the atmosphere, ice, fountains, rivers, saline springs . . . degradation of land-causes now modifying earth's surface-ancient revolutions."
>
> *Personal Journal,* vol. 8

He attempted to design an apparatus for the determination of the extent of the atmosphere. He believed that if he had the precise height of the atmosphere he could use the data to calculate the size of aerial particles.

Riddell observed showers of meteors at Worthington on November 13, 1833. He prepared a paper based on his observations for the *Ohio State Journal,* Columbus, Ohio, on November 16, 1833. A copy of his report was sent to Professor Denison Olmsted of Yale University, who quoted from it in his publications on the same showers.

While in Worthington, Riddell began his "Catalog of plants growing spontaneously in Franklin County, Central Ohio, excluding grasses, mosses, lichens, fungi, etc." This was published in two installments in the *Western Medical Gazette* in 1834.

Riddell's major botanical work during this period was his "Synopsis of the flora of the Western States." The work was begun in Worthington, and completed in Cincinnati. In the preface Riddell wrote:

> "It has for several years been the author's design to publish a flora of the Western States when he shall have accumulated a sufficiency of materials; and he takes this opportunity of soliciting information from those who may

> choose to favor him with their correspondence, and of proposing an interchange of botanical specimens with all who may wish to form collections . . . The following catalogue, though necessarily incomplete, will probably aid in effecting the desired object, by exhibiting its present state of advancement, thereby enabling observers located in different sections of the assumed territory the more easily to make additions to it."
>
> *West. Journ. Med. and Phys. Sci.*, 1834, vol. 8, pp. 329-374

This catalog is generally regarded as a contribution of major importance, the first devoted entirely to Western flora. It contained listings of 690 genera and 1800 species, with appropriate notes on localities and growth habits. The work, however, was not completely original, as was the Franklin County paper. His boundaries for the Western States extended

> ". . . from the Alleghany mountains in West Virginia to the Platte River in Missouri Territory, and from the southern boundary line of Tennessee to the latitude of Detroit,"
>
> *West. Journ. Med. and Phys. Sci.*, 1834, vol. 8, pp. 329-374

covering a large area. He "borrowed" the Kentucky plants from works of Dr. Charles Wilkins Short, and those around St. Louis, Missouri, from Dr. Lewis C. Beck, and those of the Missouri Territory were obtained from the collections of Thomas Nuttall. The work, nevertheless, was favorably received. A clipping from a Cincinnati newspaper stated:

> "Mr. Riddell is very well known to many in this city as an able, enthusiastic and indefatigable votary of science. The pamphlet before us bears ample testimony to this character, even if other evidence were wanting. To those who are pursuing the study of botany this little book will be valuable . . . We have high authority for pronouncing the arrangement good and the work very creditable to the author."
>
> *Repository,* vol. 7

The *Flora* was published by Dr. Daniel Drake in the *Western Journal of the Medical and Physical Sciences*, and also in pamphlet form by E. Deming in Cincinnati (1835). Thirteen new species were listed, of which only two are attributed to Riddell today:

Solidago Ohioensis and *Trillium nivale.*

Riddell had studied the *Characea* before publishing the *Flora* and had included several in his compilation which he thought new, but there is some dispute about them. He dedicated a new species of *Euphorbia* to his Cincinnati roommate, Dr. Otho Herron, *Euphorbia Herronii.*

About this time Riddell became acquainted with the German botanist Dr. Joseph C. Frank, who was visiting in Cincinnati. They made frequent field trips together, principally investigating grasses and sedges. Riddell wrote letters of introduction for Frank to Torrey and Short. Frank was apparenly impressed with Riddell, for he named *Solidago Riddellii* as a tribute to him.

Riddell designed and constructed a microgasometer (1834), an instrument to analyze small amounts of gases. He also modified the ordinary thermometer in an attempt to increase its accuracy. He constructed an "odometer" of unknown use and value.

Riddell was awarded the degree of Doctor of Medicine by the Ohio Reformed Medical College on April 1, 1834, following an oral examination by Drs. Morrow and Jones. His diploma was signed by these men. It was customary for three signatures to appear — Riddell's own being the third, so, to make the document a little more legal Riddell asked Mr. Paddock, his successor as lecturer at Worthington, to sign the diploma.

VIII. THE BENNETT INCIDENT 1832-1834

At frequent intervals, beginning with his stay in Wheeling, West Virginia until April, 1834, correspondence and negotiations with Dr. John Cook Bennett took up a large amount of Riddell's spare time. Bennett promised him

> "the honours of a professor of chemistry and botany. . ."
>
> *Personal Journal,* vol. 7

in a newly established college, the University of Indiana at New Albany, Indiana, sometimes referred to as the Medical College of Indiana. In addition to the professorship Riddell was to be the recipient of an honorary degree of Doctor of Medicine. Later Bennett offered him a professorship at

Western Reserve College. Bennett was an impostor, but it took Riddell some two years to find it out. The scheme was such a bold one and was carried so far that a few paragraphs should be devoted to it.

John Cook Bennett was president of Christian College and of the Medical College of Indiana, as well as one of the secretaries of the Corporation and Bishop. The Christian College was chartered to grant degrees in Arts and Sciences, Law and Medicine, as well as the degrees of Doctor of English Literature, Doctor of Languages, Doctor of Mathematics, Doctor of Natural Science, Doctor of Belles Letters [note the peculiar spelling combination], Doctor of Arts and Sciences, and Master of Arts. A "Female Department" was provided for – an idea of Riddell's – offering the degrees of Doctress of Natural Science, Doctress of English Literature, Doctress of Fine Arts, and Doctress of Arts and Sciences.

Bennett sent Riddell clippings of newspapers showing the passage of the Act of the Indiana Legislature, January 24, 1833, creating Christian College and the Medical College of Indiana. The clippings contained the By-Laws of the College and a list of its faculty. Riddell was listed incorrectly as "James Lundsford Riddell." Along with Riddell on the faculty of the Medical College were Isaac Hough, professor of anatomy, physiology, and surgery; Chauncey Fitch Perkins, professor of the institutes of theory and practice of medicine, medical jurisprudence, materia medica, and pharmacy; and, John Cook Bennett, professor of midwifery and diseases of women and children.

Bennett even went so far as to announce a date on which Riddell would begin lecturing – the first Monday in November, 1833. When pressed by Riddell for details concerning the new post, Bennett was always evasive. But when Bennett began to ask him for money Riddell became wary and disgusted. Riddell traveled to Bloomfield, Ohio, to meet Bennett and make final arrangements, but Bennett failed to appear. That convinced him that the whole situation was a fraud, and prompted him to send letters of complaint to the Speaker of the House of the State of Indiana, and to the *Morning Courier and New York Enquirer,* published in New York City.

In these complaints Riddell protested the issuance of degrees with his name signed as "Registrar and Bursar" of the University of Indiana at New Albany, and an honorary degree of Doctor of Laws (not Doctor of Medicine) attached. His letter to the New York paper was published as an advertisement:

> "I learn that diplomas have been vended to or conferred upon, individuals residing in the City of New York, and various parts of the State, the same purporting to issue from the University of Indiana, at New Albany, and bearing my name, with an honorary degree appended, as "Registrar and Bursar" of that University. Now, sir, I deem it justice to community and myself to make it known that the whole has been done without my knowledge or consent; that I was not apprized of any appointment to those offices, and that I disclaim the honorary degree alluded to."
>
> *Morning Courier and New York Enquirer,* January 14, 1834, in *Repository,* vol. 6

Riddell won his point, for a few days later the Medical Society of the City and County of New York expressed its disapproval of the situation and called the degrees fakes.

IX. CINCINNATI – 1834-1836

On April 2, 1834 Riddell set out for Cincinnati, journeying first to Columbus, then by boat to Circleville, then to Portsmouth and Cincinnati. He listed his baggage as follows: three trunks, one chest, one tub, four boxes, and one bag. This was actually all of his worldly goods, except for several boxes of specimens stored at the family home in Preston. Of these items only one was for clothing, the rest for apparatus, herbaria, books, mineral specimens, etc. The *Journal* gives a summary of the contents of each. En route to Cincinnati, he took time to examine the mounds at Circleville, visited friends at other stops, and took notes on the geology of the regions he passed through.

He arrived in Cincinnati on April 6, and checked in at the Broadway Hotel. This was too expensive for him, and the next day he moved to Mrs. Thorpe's boarding house on Broadway and Sixth St. He paid $2.50 per week, but had to

> "furnish my own washing, fuel and lights."
>
> "Our fare is plain and wholesome, doubtless as sumptuous as health requires."
>
> *Personal Journal,* vol. 11

His first call was at the office of Dr. Daniel Drake, publisher of the *Western Journal of the Medical and Physical Sciences.* He had letters of introduction to Drake, and was well received. Riddell had previously sent him one of his publications and a "suit" or collection of plants. Drake inquired whether or not Riddell was a Doctor of Medicine. Riddell replied that he was not, and later scratched out "M.D." from his open letters of introduction. He visited Drake periodically, but apparently too frequently for Drake's liking. After a short time Drake's reception of Riddell ceased to be friendly.

Riddell also introduced himself to Dr. John Locke, who was to play an important role in his future. Locke was a scientist of sorts, interested in botany and natural philosophy, and the proprietor of a "female seminary." Locke had some apparatus for demonstrating electromagnetic phenomena, and had designed a new type of galvanometer, both of which he demonstrated for Riddell. But he was unable to convince Riddell that his ideas on the cause of attraction of "dissimilar electricities" were sound. Locke's ideas are quoted in Riddell's *Journal,* but are followed by comments of disapproval.

Another of his early contacts was Dr. T. D. Mitchell of the Medical College of Ohio. Mitchell encouraged him to complete his medical studies, but indicated that since his work at Worthington was not recognized, he must attend two courses of lectures. This discouraged Riddell, because he had hoped for a quick degree. Mitchell was also very pessimistic about Riddell's giving a series of botany lectures, saying that others had failed in a similar attempt.

The initial routine in Cincinnati consisted of making acquaintances, reading, and trying to launch a subscription for his lecture series. Most of the first month was spent in preparing an "Essay on Practical Botany," giving directions for preserving plants. To further his own collecting, he purchased a new press for drying plants. The essay did not interest the local booksellers or printers, so he turned his attention to a paper on barometer modifications. The paper described a right-angled barometer, the mercury column being both horizontal and vertical, so that small changes in the vertical would produce large changes in the horizontal. Tubes of different diameters were used. The paper was published in the *American Journal of Science and Arts* [Silliman's *Journal*] (see figure 3, p. 9).

> "The design of this contrivance is to render the indications of the barometer more obvious and delicate."
>
> *Am. Journ. Sci. and Arts,* 1835, vol. 27, pp. 223-224

At this time Riddell was quite discouraged. He felt that he was making no progress. He had

> "no real friends and very few acquaintances . . . I wish I were in Chenango Co., N.Y., but I have not yet met with success enough to return with a good grace. I must brave it out a while, I think."
>
> *Personal Journal,* vol. 11

But his life was far from dull. He attended teas and sewing parties, called on many people, went on visits to gardens and on botanizing expeditions with prominent citizens, but was never really accepted as part of the community. He was almost ready to abandon his plans,

> "If I do not get a situation to suit me and which has a fair prospect of permanence, and that too in less than three months, I am resolved on settling some where in the practice of medicine. I am determined if life and health are spared, to become settled some where."
>
> *Personal Journal,* vol. 11

The eccentric scientist was still concerned about the welfare of his mother and family. From letters received he had learned that they had moved to a house on a nearby farm, the Hancox place, for

> "$10 a year for house, garden and the use of a crib."
>
> *Personal Journal,* vol. 11

His mother was doing most of the farming, with the assistance of brother George. His brother Samuel was living with his sister and her husband, and learning blacksmithing. He

wrote to his mother to tell Samuel

> ". . . not to seek the bad company of wild and reckless boys, and by all means to abstain from little petty thievery."
>
> *Personal Journal,* vol. 11

Perhaps this last warning was a reminder of his own adolescent years.

The botany lecture series, given in the meeting room of the Cincinnati Medical Society, proved to be only moderately popular, and did not furnish enough money for him to live on, as he had expected. Of necessity Riddell was forced to solicit subscriptions for herbaria, a task which greatly annoyed him. He felt that this activity would lower him in the estimation of fellow scientists, but it provided, throughout the next year or so, the bulk of his income.

On May 8, 1834, Riddell lectured at the Mechanics Institute "On the Methods of Forming Herbaria and on the Affinities of Plants, Illustrated by a Beautiful Exhibition of Specimens, Taken Mostly from the Forest and Prairies of Ohio."

In the course of his social life he visited Harriet Beecher, the authoress, at her home, and called on Nicholas Longworth, vine grower and horticulturist, several times. His subsequent relationships with Longworth (1836) were not too cordial. Riddell also records a visit to Daniel Gano's garden on May 22, 1834. Gano was one of the subscribers for his lecture series, also one of the purchasers of a herbarium. It was from Gano's great-great-niece that some of Riddell's original specimens came into the possession of the Lloyd Library and Museum of Cincinnati, Ohio. These specimens, and others in the British Museum of Natural History, the Academy of Natural Sciences, Philadelphia, Pennsylvania, the New York Botanical Garden, the Gray Herbarium of Harvard University and the Department of Biology, Tulane University, are the only ones extant, so far as is known.

Riddell asked Dr. Drake and others to recommend him for a professorship of chemistry at the Louisville Medical College. Drake wrote to Dr. Joseph N. McDowell on June 13, 1834, stating that

> "He (Riddell) has delivered several courses of lectures on chemistry with approbation. His talents are respectable; his personal appearance fine; his manner remarkably modest and unobtrusive. . ."
>
> *Personal Journal,* vol. 11

These remarks do not quite fit subsequent actions. Several weeks later Drake's son told Riddell that his father had received a letter from Louisville from McDowell for Riddell. When Riddell asked Drake Sr. for it, he denied that any letter had arrived, and never did produce it. Riddell could not understand Drake's actions, unless, as he surmised, Drake was annoyed at the contents and wanted McDowell to write another less favorable.

It was at this time that Riddell learned of Dr. Josiah Hale of Alexandria, Louisiana. Dr. Hale was an accomplished botanist, so Riddell sent him one of his pamphlets. Hale later called on Riddell in New Orleans, Louisiana, (June 8, 1838) and the two became fast friends, and also were associates in the New Orleans Academy of Sciences (1853). Hale was buried in Riddell's tomb in the Protestant [Girod Street] Cemetery, New Orleans, Louisiana.

During the summer of 1834, Riddell went on a botanizing expedition through the Miami country, visiting Hamilton, Oxford, Middletown, and Dayton. He was well received at Miami University, where the president contracted for a herbarium and asked him to return to lecture on botany for several weeks during the regular session. We do not know that he did so.

The following winter Riddell studied at the Medical College of Ohio, lecturing occasionally, collecting and selling plants, and writing. His *Repository* contains his notes of lectures in surgery by Dr. Trauth, on practice by Dr. John Eberle, on materia medica and operative surgery by Dr. Smith, and others. He assisted Dr. James B. Rogers in the chemistry lectures, with little or no remuneration.

Riddell was living at the Commercial Hospital with his friend Dr. Otho M. Herron. Riddell and Herron were good friends and business partners. The exact nature of their business agreement is not clear, but Herron was a shareholder in Riddell's herbarium and plant collecting enterprises. Riddell suspect-

ed that this led to a distinct coolness between them. He moved to a new room, near the corner of Walnut and Fourth Streets, for $5.00 per month. He took his tea or supper at the Pearl Street House, and lived on bread and milk for the rest of the day. Riddell and Herron retained their friendship, and some months later they were together again at the Commercial Hospital. In 1836, Herron was instrumental in arranging Riddell's marriage.

Riddell was elected a junior member of the Medical Society of Cincinnati and later (1835) was chosen as the curator of the cabinet of minerals. He was still not a fully accepted member of the Cincinnati group, for he was not included in Dr. Drake's parties, nor was he introduced to the ladies of the Drake family. He did attend the Swedenborgian Church regularly.

Perhaps the most interesting experience during the winter of 1834-1835 was his participation, as an assistant, in a balloon ascension. A Mr. T. Kirkby had arranged with Riddell to ascend in a balloon, with Riddell making scientific observations during the flight. The proposed ascension received good publicity in the *Daily Gazette* and the *Republican*. Since the balloon was unable to support both men, Riddell was forced to remain on the ground. The *Republican* noted that the

> "extensive preparations which the doctor had made for scientific experiments and observation, added to his undoubted capacity and praiseworthy enthusiasm, would have rendered his excursion valuable to science and could not have failed to result in various discourses of a rare and interesting nature."
>
> *Personal Journal,* vol. 12

It is worth recording that one of the preparations made by Riddell was the drawing of a will, parts of which (perhaps all) he noted in his *Journal,* appointing Dr. Herron as executor and leaving all of his property to his family.

Riddell's "Geology of Ohio" was published by Dr. Daniel Drake in the *Western Journal of the Medical and Physical Sciences* in 1833. The work impressed Drake so favorably that he added his own comments to it. The same paper was printed in the Cincinnati *Chronicle* on February 15, 1834.

A short paper "On the vegetable origin of coal" appeared in the Cincinnati *Mirror* on January 17, 1835. This was Riddell's reply to a series of lectures by a Dr. Powell with whom he did not agree. The "Geological Features of Ohio" appeared in the Newark *Gazette* on April 13, 1836, and "Remarks on the geological features of Ohio" in the *Western Monthly Magazine* in March, 1836.

The "Geological ramble on the western reserve," an account of Riddell's expeditions in and around Cleveland, Ohio, in 1835, were published a year later. The work is less technical than the previous ones, containing more descriptive material.

Riddell lectured at the Mechanics Institute on "Electricity, Meteors and Clouds" on February 14, 1835, and on the "Penetrativeness of Fluids" on March 14, 1835. This lecture was published in the *Western Medical Gazette.*

One of Riddell's favorite subjects – permeation or permeability of membranes – was the topic of his lecture before the Cincinnati Medical Society, April 2, 1835:

> "On corpuscular permeation and the attendant phenomena with applications to physiology."

This subject always evoked much discussion, greatly pleasing Riddell, except when he was unable to convince his opponents. He believed that

> "permeation is controlled by the relative nature of the liquid and the membrane or medium."
>
> *Repository,* vol. 6

He also recognized that

> "if a membrane or tissue will tolerate the infiltration of a liquid solution, the permeation will proceed more rapidly in proportion as the solution is less dense; and most rapidly when the menstrum or solvent liquid alone is used."
>
> *Repository,* vol. 6

In his simplest experiment be used a small vessel completely filled with alcohol, and tied a piece of bladder over the open end, and then placed the vessel in a large container of water. The bladder surface was initially plane, but under water

> "now presents a very prominent convexity (endosmosis). If the experiment is repeated

> with water in the small vessel and alcohol in the larger vessel, concavity (exosmosis)."
>
> *Repository,* vol. 6

Riddell also set up a series of experiments analogous to Graham's diffusion experiments, using powdered emery, powdered glass and insoluble precipitates to test capillarity and permeation. In discussions he chose his illustrations from nature – fungi, lichens, algae, the glands and the liver.

During the winter of 1834-1835 he had not heard from Catherine Burr, nor had he written to her. He had indirect knowledge of her from friends, and when he was told that she was

> "rather worsted in appearance. . ."
>
> *Personal Journal,* vol. 13

by illness, he concluded that she was suffering from consumption. When he did write to her he stated:

> "I deeply regret that my worldly condition does not warrant me in making such immediate proposals as my feelings dictate."
>
> *Personal Journal,* vol. 13

In one of his periodic letters to his mother he gave full directions for his brother Samuel to come to Cincinnati to join him, and to help him with his collecting of plants and preparations of herbaria. If Samuel did not want to make the journey, his mother was urged to send his brother George. For three months he expected Samuel, but Samuel did not appear. His mother wrote that he had left Preston on May 8, 1835, and no one had heard from him or of him in September. The *Journal* contains frequent references to this situation, for John Leonard wanted Samuel to assist him on his summer field trip, but there was no Samuel. The elder brother was somewhat worried, and greatly irritated by his younger brother's conduct.

During the summer of 1835, Riddell and his friend A. O. Lindsley traveled most of the state of Ohio on a botanizing and geological expedition. They were business partners in the sale of herbaria. From Cincinnati they traveled to Portsmouth, then to Chillicothe. At Portsmouth, Riddell found

> "plants he had never seen before, none of them not hitherto accredited to the Western States,"
>
> *Personal Journal,* vol. 13

and was also quite ill with cholera. The partners had little success with their subscriptions in Chillicothe, and likewise little success botanizing, for Riddell complained that the sheep and cattle had ruined the flowers and herbs.

From Chillicothe they traveled to Columbus and called on old friends there, particularly Increase A. Lapham, secretary of the Historical and Philosophical Society, and on Dr. Ichabod G. Jones, one of Riddell's instructors at Worthington. While in Columbus he learned that a Mr. Acheson, a slight acquaintance from Wheeling, and a friend of his former landlord King, was in town. This information produced the remark

> "I should like to see the Acheson faithfully plastered in mud, with a special reference to his shameful behaviour to myself."
>
> *Personal Journal,* vol. 13

What provoked this language is not clear, but was probably part of the Wheeling incident.

Riddell traveled from Columbus to Hebron to Mount Vernon, where he visited Catherine Burr at her brother's home. Catherine was not as ardent as before, but they did travel to Gambier together, rambled in the woods and attended church. When they parted, for the last time, on July 9, 1835, Catherine, at his request, gave him a lock of her hair, which is now in the Archives of the Howard-Tilton Memorial Library of Tulane University, New Orleans, Louisiana.

In spite of the fact that his old feelings for Catherine were aroused again, he wrote

> "I have once more become rather convinced that circumstances will for some years perhaps prevent my forming any matrimonial agreement. I am the oldest child of my dead father's destitute family. A great responsibility rests on me."
>
> *Personal Journal,* vol. 13

From Mount Vernon to Webbsport to Zanesville, back to Webbsport, then to Coshocton, Roscoe, Dover, Massillon, Akron, and Cleveland was the route taken by the two solicitors. There was not too much success in Zanesville, for the citizens were too poor to patronize a botanical project, and little profit was left when they reached Cleveland. Riddell was ill with intermittent fever in Dover, and again in Cleveland.

On August 17, 1835, Riddell lectured in the Courthouse in Cleveland "to a respectable audience" on the "Forming of Herbaria" and illustrated the address with an exhibit of specimens. There were no subscriptions forthcoming.

He remained in Cleveland for some time, taking many side trips or "rambles" to the surrounding countryside. Some of these are summarized in his paper "A Geological Ramble." There was still no word from Brother Samuel, so John Leonard inserted an advertisement in the *Daily Cleveland Herald,* on August 25, 1835, as follows:

> "Samuel T. Riddell left his mother's residence in Preston, Chenango County, New York, on the 8th of last May, with the intention of visiting the subscriber in Cincinnati. He was expected to go by stage to Syracuse, thence by canal to Buffalo, to cross the lake to Cleveland, and to follow the canal and the Ohio River to Cincinnati. He is 16 years of age, 5 ft 8 inches in height, rather slim, with light brown hair, full face and fair complexion; the little finger has been cut from his right hand. His clothing was a fur cap lined with blue silk, coat and pantaloons of blue broadcloth, with yellow metal buttons on the coat, blue and white vest and calf skin boots. He has not been heard from since he left, and as there is reason to believe some misfortune has befallen him, his friends are extremely anxious to ascertain what has become of him.
>
> "Editors of newspapers on the New York and Ohio canals are requested to insert this. Any relevant information will be thankfully received if addressed to the subscriber at Cincinnati or Mrs. Lephe Riddell, Preston, Chenango County, New York."
>
> John L. Riddell
>
> *Personal Journal,* vol. 13

Riddell then took steerage passage on a lake vessel for Buffalo en route to his old home in Preston, New York. He was retracing Samuel's supposed route and inquiring on the way. He was ill with fever in Buffalo, and remained there a few weeks. Subscriptions in Buffalo were very good. From Buffalo he traveled to Syracuse and Rochester, then to Preston. He noted that his income for the summer was about $201.00, not all in cash. He had traded some plants for books and a watch, but had $175.00 in cash. En route, he visited his sister Mariah and her husband. Ruel Crumb, and his sister Lovina. Lovina accompanied him to Preston. While passing through Solon, New York, he recalled teaching there when he was seventeen years old, and remembered Sarah Ann Hawley.

He never did locate Samuel, but did find that he had worked for several months as a driver for the towing company on the Erie Canal. Riddell spent four days at home – a very short visit considering the distance he had come and the financial sacrifice. His brothers George (age 13), William (age 7) and his sister Susan (age 4) were at home with his mother. Like a dutiful elder brother he brought presents with him. As would be expected from a man of his disposition, John Leonard itemized each gift he presented.

> "To George: a toothbrush and a gold quarter eagle ($2.50).
> To William: half a dollar.
> To Lovina: silk pocket handkerchief and toothbrush.
> To Susan: a piece of calico worth 30¢ and a quarter of a dollar.
> I brought Mother: 2 bushels of cornmeal, $2; half a bushel of ground wheat, 75¢; half a bushel of turnips, 12¢; a penknife, 31¢; paper, 6¢; half a set of knives and forks, 41¢; 12 pounds of nails, 96¢; tea, 25¢."
>
> *Personal Journal,* vol. 13

He also left $30.00 with his mother for repairs on the house and cellar, and for the purchase of firewood for the winter. While at home, he visited with Randolph Williams and other old friends, and discussed his mother's financial condition at length, itemizing the existing family debts. His mother's relatives were still holding a note against his father's estate for about $40.00, given for the purchase of a horse before John Leonard was born.

On his return to Cincinnati he stopped in Norwich and paid all debts that he had incurred when he taught there in 1830. His mother wanted him to take some of the family possessions with him, but he accepted only a handmade coverlet as a keepsake. He returned by the same route and arrived in Cincinnati on October 30, 1835.

As Riddell had foreseen, there was an internal feud in the Medical College of Ohio. Dr. Daniel Drake took advantage of this, and established the Medical Department of Cincinnati College, on June 27, 1835. He

served as dean and professor of the theory and practice of medicine; and his associates were Dr. Joseph N. McDowell, special and surgical anatomy; Dr. Samuel D. Gross, general and pathological anatomy, physiology and medical jurisprudence; Dr. Horatio Jameson, surgery; Dr. Landon C. Rives, obstetrics and diseases peculiar to women and children; Dr. John P. Harrison, materia medica, and Dr. James B. Rogers, chemistry and pharmacy. Riddell was listed as adjunct professor of chemistry and lecturer on botany. His lectures on botany were

> "strongly recommended by the Trustees and Faculty, but not requisite to graduation."
>
> *Repository,* vol. 7

Riddell assisted Dr. Rogers, held private classes in chemistry and botany, and attempted a special series on chemistry for young ladies.

His friendship with Dr. Herron had been resumed, for we find in the *Repository,* Volume 7, "Discussions, Physical and Metaphysical, between H and R," a few pages of miscellaneous questions and answers.

Riddell was still unmarried, and still very lonely, even though his mother had indicated she would favor his marriage. On November 1, 1835, Dr. William Byrd Powell of New Orleans, Louisiana met Riddell, and asked for his address. This puzzled Riddell, for he wrote

> "I cannot conceive what the Doct. would be at, unless it be to get me appointed Professor of Chemistry in the New Orleans Medical College, a place which he now holds himself."
>
> *Personal Journal,* vol. 14

This prediction was correct, but it was not until the summer of 1836 that the formal offer of the position was received and accepted.

Since his days at Worthington he was one of a small group urging the Legislature of Ohio to authorize a complete geological survey of the State. He was naturally thinking of a job for himself, and openly announced his candidacy for the post of State Geologist. In his opening message to the Legislature in the fall of 1835, Governor Robert Lucas asked for such a survey. The *Repository* contains many clippings indicating much pressure on the Legislature to carry out the Governor's request. It is certain that some of these were instigated by Riddell. In the spring of 1836 Dr. Samuel Prescott Hildreth, Dr. John Locke, Increase A. Lapham and John Leonard Riddell were appointed by the Legislature to make the plans for a complete survey of the state. The four were good friends, and Riddell did not object to the appointment of Dr. Hildreth as chairman. The committee agreed to split the state into four divisions, each member planning to work in his area for two months during the summer of 1836. They reported to the Governor and Legislature, but were not given the complete authority they requested. A new committee was formed, consisting of the same four men, and W. W. Mather, Dr. Jared Potter Kirtland, Charles Whittlesey, Caleb Briggs and J.W. Foster. They were charged with studying the

> "topography, relationship of rock strata, extent of ore beds, etc. marl, iron ore, value of ores. . ."
>
> *Personal Journal,* vol. 14

Lapham was unable to participate, so Riddell volunteered to do Lapham's portion of the survey as well as his own. In 1837, Riddell submitted his portion of the survey to the new governor, Joseph Vance. His material, a compilation of all of his Ohio explorations was appended to the "Geological Survey" when it was issued by the state printer J.B. Gardiner, in Columbus, Ohio, in 1837.

Riddell was still much concerned about his family, but was now able to send his mother an occasional ten or twenty dollar bill. In each case he noted carefully the denomination and number of the bill, and the bank of issuance.

On January 27, 1836, Riddell noted that he was finally out of debt, and had enough money

> "to meet my contingent and unavoidable expenses probably for some time."
>
> *Personal Journal,* vol. 14

This was really the first time in his entire life that he did not express worry about his financial condition.

Riddell completed his work for the degree of Doctor of Medicine and was gradu-

ated on March 5, 1836, writing his thesis on the nature of contagions and miasmata. The thesis was very well done, and was presented to the Cincinnati Medical Society in a lecture on February 3, 1836. Riddell's interest in contagions stemmed from his days at Worthington, for he had lectured there on the animalcular theory of contagious infections (January 9, 1834). At the meeting of the Medical Society, there was the usual argument against his theory, but Dr. Daniel Drake came out in Riddell's defense, adding his strength and prestige to the theory. Riddell's principal point was that contagious diseases must be caused by organic, living things. Riddell was far ahead of his times in his reasoning, and this paper was one of his major accomplishments.

On March 16, 1836, Riddell presented his "Synopsis of the Flora of the Western States" and his supplement, with exhibits, before the Western Academy of Natural Sciences, of which he had been chosen a member. He was also honored with corresponding membership in the Maryland Academy of Sciences and Literature.

"The Supplementary Catalog of Ohio plants" appeared in the *Western Journal of the Medical and Physical Sciences* in 1836. This contained seven new species, of which four are still credited to Riddell:

Linum sulcatum
Scutellaria saxatalis
Stachys cordata
Helianthus occidentalis

An attempt to simplify the nomenclature of organic chemistry was published in the *Western Journal of the Medical and Physical Sciences* in 1836. Riddell devised various abbreviations in a rather futile attempt at simplification. The use of the following symbols was advocated:

oxygen . . . . o	d 1	z 9
hydrogen . . e	1 2	i 10
nitrogen . . . a	r 3	ii 100
carbon . . . . u	m . . . 4	

There were two basic rules in Riddell's system:

> "Rule 1. In the formation of a name, those mineral and elementary symbols referring to each other are placed side by side, the former on the left hand, the latter on the right.
>
> "Rule 2. When a mineral consonant occurs on the left hand of the mineral vowel i, the two letters are factors; they are to be multiplied together. When the consonant occurs on the right hand, its value is to be added to that of the vowel.
>
> "Examples: mi . . . 40; im . . . 14;
> mm . . . 44; tip . . . 86.
>
> "Note: The letter d when a factor may either be prefixed or omitted as the harmony of the syllables require."

Characteristic illustrations of this mnemonic nomenclature are:

oxalic acid . . . . . luro
mellitic acid . . . . . muro
amylic acid . . . . . vupo
acetic acid . . . . . remuro
lactic acid . . . . . mepumo
citric acid . . . . . mulemo
uric acid . . . . . lavulero

oil of cloves . . . . . voireliu
olive oil . . . . . ronieviru
cane sugar . . . . . tozute
caffein . . . . . lotuvela
urea . . . . . ruperora

water . . . . . ode
nitric acid . . . . . avo
alcohol . . . . . orelu
ether . . . . . ovemu
morphia . . . . . porimuitea
codeia . . . . . voriulidea

West. Journ. Med. and Phys. Sci., 1836, vol. 9, pp. 687-690.

Riddell divided organic compounds into four classes: acids, vegetable alkalies, inflammables and neutral bodies, as noted from the illustrations above. His method is far from simple, and did nothing to further his aims. His notebooks contain only a few references to his own use of symbolism in this field.

On one of his visits to Dr. John Locke he

> "saw a tall, dark-eyed lassy belonging to his school, from the 'low country' . . . we often saw each other with none present but the Doctor's children, who are little boys."
>
> *Personal Journal*, vol. 14

Here began a serious romance. Mary Elizabeth Knocke, or Mary Bone, or Mary Schrager (all three names were used initially) was immediately captivated by Riddell. She was an orphan from New Orleans, Louisiana and knew little of her background. John Leonard became more and more interested, and wished for additional information about her family and financial condition.

During his Worthington stay Riddell had met Colonel George William Boyd of New Orleans. Boyd was much impressed with Riddell's lecturing and with his herbaria. He had corresponded with Riddell, so the young doctor wrote a letter requesting Boyd

> "to apprise me if the chair of chemistry in the New Orleans Medical College becomes vacant . . . that if I do not see a prospect of promotion here I would have no objection to spending my winters there. . ."
>
> *Personal Journal,* vol. 14

He told Boyd about his meetings with Mary, and asked him to find out all he could about her uncle, Jacob Schrager, and her guardian D. F. Burth.

> "Now, if this orphan girl, for whose welfare I feel a deep interest, being of respectable parentage, has enough of this world's riches to enable me to support her in the quiet station we should aim to occupy, Heaven permitting, I am resolved to make a wife of her."
>
> *Personal Journal,* vol. 14

Riddell realized that his friendship with Mary would antagonize Dr. Locke, but he was determined to woo her in spite of this. On his twenty-ninth birthday he wrote wistfully:

> "Ah, me, time I had a wife . . . I cannot deny that my Creole Mary of the female seminary frequently engrosses my thoughts . . . she hath no careful mother to tell her not to engage in flirtations—but, not overstepping the bounds of modesty, she acteth up to the promptings of her warm feelings, and I love her for it."
>
> *Personal Journal,* vol. 14

While carrying on his courtship of Mary he was linked romantically with Eveline, a nurse and servant girl at Dr. McDowell's home. The intrigue was all Eveline's – she wanted to marry him but he spurned her – so Eveline created some scandalous stories about Riddell and circulated them. These did not help his reputation with his fellow faculty members in the Medical Department.

Since the Lockes did not approve of any of the students receiving callers, Riddell's meetings with Mary were in secret. Locke's young son, John, served as intermediary, transmitting letters and packages, but the boy soon turned against them. Meetings were then confined to public streets, where they would walk together, or occasionally go riding. One Sunday evening Mary came to his room in disguise.

> "She remained three hours during which time many pleasant sayings and doings were exchanged, but nothing I presume which her mother would have found fault with, unless she would object to her daughter's being kissed while lying on the sofa . . . I convinced her that I was accomplished in the famous art of kissing."
>
> *Personal Journal,* vol. 14

The pseudo-affair with Eveline came to the attention of the Lockes, who tried to turn Mary against him. He wrote to Mrs. Locke that his intentions were honorable, and that he planned to marry Mary. Mrs. Locke turned his letter over to her uncle, Nicholas Longworth, giving it a most improper interpretation. Longworth was set to "expose" Riddell, but was prevailed upon by mutual friends not to do so. Riddell wrote a letter to Longworth explaining the entire situation, but did not receive a reply. Dr. Herron and other friends were urging him to marry immediately, but there were legal entanglements because of the fact that Mary was an orphan. Marriage in Indiana was suggested, but did not prove feasible.

On June 19 he had definitely decided to elope the next day. He was planning to be away from Cincinnati on the geological survey for several months, and decided that Mary should go with him. The marriage was arranged by Dr. Herron, Dr. Morgan and Esq. Fobes. These three men took Mary and John Leonard to Newport, Kentucky on June 20, 1836, where arrangements had been made at Baxter's Tavern. Dr. Herron was called upon to swear that

> "the young lady's former guardian, Mr. Burth, was much gratified with preference which I (Riddell) had given her."
>
> *Personal Journal,* vol. 15

The marriage was performed by Rev. Mr. Southgate between eight and nine in the evening. The ceremony was witnessed by Mr. Pendleton, Clerk of Court, the three Cincinnati friends, Mr. Baxter and several others. Dr. Herron was the best man. The group returned to Cincinnati for a wedding supper at the home of Esq. Fobes. John Leonard and his bride left the next morning on their summer explorations.

At their first stop Riddell wrote an explanatory letter to Mr. John W. Holland of New Orleans, Louisiana, Mary's present guardian. Holland replied promptly, extending good wishes, whereupon Riddell wrote a letter of inquiry concerning Mary's financial condition. This matter was not completely cleared until much later when they went to New Orleans to live.

The young couple traveled from Cincinnati to Pleasant Ridge, Clarksville, Yellow Springs, Springfield, West Liberty, Sandusky, Springville and Wooster. Riddell examined geological formations, analyzed mineral springs and water, studied the flora, and interviewed many of the farmers and townspeople about the mineral wealth of the regions. These details he recorded with care. This information, and that collected the previous summer, furnished the bulk of his report to the Governor of Ohio. The material was actually sent from New Orleans to Governor Joseph Vance on January 12, 1837, and is thirty pages in print.

Riddell was tempted to purchase 120 acres near Springville, Ohio. The land contained springs with a high concentration of magnesium sulphate, and Riddell contemplated manufacturing laxative salts from the water.

The return of the young people to Cincinnati in August, 1836, was not a happy one. The wives and daughters of Dr. Locke's associates and many of Riddell's friends would have nothing to do with Mary because

> "she came to my room before we were married."
>
> *Personal Journal,* vol. 15

Part of this confusion was caused by Eveline, who continued to spread stories. Mary knew all about Eveline, and the reasons behind the actions of the ladies of Cincinnati.

X. NEW ORLEANS – 1836-1840

In October, 1836, we find the Riddells en route to New Orleans, Louisiana on the steamboat *Gazelle.* Dr. Riddell has been offered the professorship of chemistry at the New Orleans Medical College, as he termed it, replacing Dr. William Byrd Powell, resigned. The correct name of the institution was the Medical College of Louisiana. His formal acceptance was written to Dr. Edward Hall Barton, the dean of the College, on November 2, 1836. On their arrival in New Orleans the Riddells resided temporarily on the southwest corner of Canal and St. Charles Streets, and later moved to their own home at Camp and Bartholomew, No. 328 Camp Street.

Riddell's initial appointment was as professor of chemistry. For 1838-1839 the appointment was as professor of chemistry and pharmacy. He was also co-professor of materia medica, therapeutics and hygiene during part of 1839, in addition to his duties in chemistry.

One of the first things Riddell did in New Orleans was to investigate the status of Mary's property. It was necessary to arrange for Mary's emancipation, which was done with the assistance of Colonel George William Boyd and of Judge Charles Tessier of Baton Rouge, Louisiana. Mary's father, Ludovic Knocke, had been murdered in Baton Rouge about 1825. He owned some land and two houses, had about $1000 in cash at the time of his death, and was also a partner in a "teaching establishment." Mary's uncle, Jacob Schrager, died in 1832. As the years passed Riddell's management of Mary's property was most successful, so that their financial worries were over.

The first child of Mary and John Leonard was born April 2, 1837, John Schrager Riddell. The boy died on June 6, 1837. A second son, Sanford Schrager Riddell, was born August 22, 1838. Mary was not well for some time afterward, and early in 1839 Mrs. Lephe Riddell, John Leonard's mother, and his sister Susan came to New Orleans to live with him and to help with the baby.

Riddell maintained an extensive correspondence with scientists during most of his New Orleans life. Some of these letters give us an indication of his activities, such as the following one, addressed to Robert Buchanan, commission merchant of Cincinnati, Ohio:

> "I sent you a package of plants and letter by the S. boat Independence about a month ago; . . . I hope you have received them. I have requested the Secretary of Gov. Vance

(Mr. E. F. Drake) to send me through you a number of copies of my geological report . . . Is poor Herron living? You know he was physician to the hospital and lately staid with Mr. DeCharnes. I sent Herron a draft for $60 at the time I sent your package, on the house of McClellan and Yorke "payable to his order only." I should like to know whether it had been presented for payment.

"I left in the care of Dr. J. B. Rogers of the Medical College, 5 boxes of minerals, fossils, etc. They were placed underneath the seats in the chemical lecture room.

Box no. 1. Eastern minerals
2. Eastern minerals
3. Wooster fossils from Dr. Bissell
4. Collected in Ohio in 1836
5. Western specimens

Weight of all perhaps 4 or 5 hundred pounds. I will thank you to send all the boxes to Yorke Brothers, where I will pay charges.

"I spend my time now in botanizing and in writing a monograph of the ligneous plants of Ohio, classified and distinguished from leaves alone. I design to have a wood cut of every leaf. It may extend to 300 printed pages. If the Western Academy was sufficiently in funds and so disposed I would offer it for publication. I design it more for the general reader than for the professed botanist. . .

"We have a stout healthy son three weeks old; — my wife enjoys her accustomed health and strength, sends her love to Elizabeth."

J. L. Riddell to Robert Buchanan, April 25, 1837. Letter in Simon Gratz Collection, Historical Society of Pennsylvania

In a letter to his old professor, Amos Eaton:

"As a small token of my unabated esteem, I have sent you to the care of Dr. Torrey of New York, a package of Louisiana plants, gathered mostly during the last summer. Of the new ones I have sent specimens with full descriptions for insertion in Torrey's *Flora of North America.* If you should publish another edition of the Manual before the completion of his work, I will, if you wish it, prepare . . . descriptions of new and little known Louisiana plants, in accordance with the general plan of your work, and forward the same to you by any time you may designate. . .

"I publish nothing now-a-days, not because I am idle, but because it costs nearly three times as much money here as at Philadelphia to procure printing."

J. L. Riddell to Prof. Amos Eaton, November 10, 1838. Letter in the Albany Museum Archives, State Museum, Albany, N.Y.

Riddell, naturally, was active in scientific and in political circles in New Orleans. In July, 1837, he devised a set of abbreviations for recording the steps and results of procedures in qualitative analysis. The symbols and characters resemble a shorthand. His *Journal* gives a lignite analysis and a mineral water analysis in terms of these symbols. They seem to us today to be completely useless.

After he was firmly established at the Medical College of Louisiana Riddell resumed his collecting and exchanging of plants, and in 1838 discovered a

"new and remarkable species of *Asclepias.*"
Personal Journal, vol. 17

dedicating it to Dr. Daniel Drake, *Asclepias Drakeana.*

He noted in his *Journal* on July 3, 1838

"I am about publishing a book on the botany of Louisiana."

Personal Journal, vol. 17

He envisioned a catalog containing plates of leaves lithographed by a special process. Riddell tried several methods, made plaster casts of leaves, and ended up with "phyllographic printing." His directions are as follows:

"Spread the upperside of a dry leaf with adhesive plaster by rubbing on a hot flat iron — or a hot flat iron on it — so as to imbue its whole substance therewith. Lay the upper surface on a dry, polished lithographic stone; lay clean bibulous paper over it and run over a hot flat iron, so as to cause it to adhere. Moisten the stone with a sponge and ink in the ordinary way. Print with a soft roller or downward direct pressure. It will be well to rub down the prominent veins with pumice stone and oil the surface with a hair pencil previous to printing."

Personal Journal, vol. 17

Samples of this method are given in his *Journal.* The book referred to was in preparation over ten years, and was the "Catalogus florae ludovicianae."

Riddell was very popular with his students, for several of his "introductory lectures" were published at the request of his students. But he was not certain that he wanted to remain in New Orleans. On one occasion he wrote to his mother that he still planned to return to Preston to practice

Figure 4. A page from Riddell's *Personal Journal* showing one of his illustrations of "phyllographic printing" (Howard-Tilton Memorial Library, Tulane University).

medicine. His feelings are also evident in a letter to Dr. Daniel Drake, June 6, 1838:

> "Though my prospects in a pecuniary point of view are fair enough here; yet the want of congenial society – I mean the entire want of associates in the prosecution of the natural sciences, causes me to think often of Cincinnati."
>
> *Personal Journal,* vol. 17

In his early years Riddell's scientific work had been concentrated in the fields of chemistry, botany, and geology. The investigations of his New Orleans period were primarily in the fields of natural philosophy (physics) and medicine. The fundamentals of mechanics were disturbing to him. He was not able to picture, to his own satisfaction, the constitution of matter. He was not able to explain collision processes. He did not agree with the Newtonian theory of gravitation. Most of his speculations dealt with attempts to answer these questions, culminating in his "Constitution of Matter" lecture and paper (1846).

In 1839, Riddell noted that his monograph on the "Ligneous plants indigenous to Ohio" was ready for distribution. The manuscript had been sent to the *Hesperian* in Columbus, Ohio, November 24, 1838.

In February, 1839, Riddell turned his attention to a program to secure authorization by the Legislature of the State of Louisiana for a geological survey. He memorialized the Legislature, and also wrote several articles for the bilingual French-English newspaper, *L'Abeille de la Nouvelle Orleans.*

From April 15, 1839, to May 24, 1839, Riddell visited Texas, going from New Orleans by sea. This was the first time that he was out of sight of land, and boasted that he was not seasick. The phosphorescence of the agitated sea water at night intrigued him. He records, unfortunately, that he was quite seasick before the voyage was over.

From September 15, 1839, to November 15, 1839, he was engaged in a geological field trip in Texas. The purpose of this expedition is given in the following extract, written at the time of Riddell's death. The date in the second paragraph, 1838, is incorrect, and should be 1839.

> "About this time (1837-1838. . .) much was said concerning certain mines of gold and silver in Texas, especially the "San Saba" which were said to have been worked at one time with great success by the Spaniards. Report further stated that, owing to the great severity of the Spaniards toward the Indians, whom they compelled to work these mines, a general massacre followed, in which every Spaniard perished; and further, that through fear of like abuses and through jealousy of their own rights in the matter, the Indians had ever since concealed as much as possible, and guarded with untiring vigilence against the approach of any whites. A company was formed to purchase and locate lands as near as possible to these mines.
>
> "In 1838 Dr. Riddell was engaged by this Company to explore this section of the country, and if possible find the true location of these mines. He spent three months in the wilds of Texas, in the service of the company. The party penetrated nearly to the supposed locality of the mines, but becoming more and more annoyed by the Comanche Indians, judged it hazardous to remain very long; it was in fact no easy matter to discover in so short a time, a mine, concerning which so many conflicting opinions were rife; yet the objects of the company were in part realized, since they had obtained the data from which to judge the general mineral character of the country. For this service he received one share in the rights of the company, equivalent to 10,000 acres of Texas lands."
>
> *The Daily Southern Star,* New Orleans, Louisiana, October 8, 1865

The Texas survey was quite extensive, and one complete volume of Riddell's *Journal* is devoted to the trip. His companion on the journey was fifteen year old Frederic Banks, his wife's cousin, then living with him. They did not make the entire trip alone, for in many places quite an assortment of military personnel accompanied them. The *Journal* account is filled with descriptions of formations, flora, Mexican food, bits of history, and details of their camp life.

"Observations on the geology of Trinity County, Texas" was published in the *American Journal of Science and Arts* in 1839. This is a detailed description of soil, rocks, springs and terrain of the territory covered. He gives the analyses of waters found in the mineral springs, and comments particularly on the brown coal or brown lignite deposits. In addition to these items he comments on the economic possibilities of the region. It was Riddell's idea that the city of Galveston, Texas, should become a coal market, and that the brown coal or lignite be used for fuel on ships. He also thought that Galveston should become an outlet for the export of salt obtained by evaporation of the waters of the nearby springs. Neither of these possibilities became a reality.

Riddell's wife Mary died of tuberculosis on December 20, 1839. Riddell was greatly affected, and wrote in his *Journal:*

> "She was kind, tractable and pleasant in her disposition, and devotedly affectionate. She was light and elegant in her form, handsome in her features, and highly accomplished in her education. True, as she married young and from a boarding school, she was less forward in fashionable society than many of less than half her worth, yet this retiring disposition of hers concentrated her whole feeling and attention at home, and served but to endear her the more to me. She is forever gone and I feel no disposition to let another usurp her place in my affections; neither under present circumstances would I wish to marry again although I could acquire wealth thereby. Therefore let my affections and energies hereafter, as before my marriage with Mary, be devoted to those natural sciences of which I am fond."
>
> *Personal Journal,* vol. 18

After Mary's death his mother took charge of the household. She immediately objected to a Dutch girl named Eliza, who was both chambermaid and nurse. Reluctantly Riddell consented to her dismissal.

On his return from the Texas ramble, Riddell received an appointment from President Martin Van Buren as melter and refiner at the United States Branch Mint in New Orleans. He held this position, in addition to his teaching duties at the Medical College of Louisiana, until 1848. He records the appointment:

> "Returning two weeks since I found that I had been honored with an appointment in the Mint, which alone while it may last, secures me all the independence in the way of wealth I desire."
>
> *Personal Journal,* vol. 18

He moved his family to the Mint shortly before Mary died. While this may have been beneficial to him financially, the new position was a source of serious trouble.

XI. THE NEW ORLEANS BRANCH MINT – 1839-1848

The United States Branch Mint at New Orleans was under the supervision of Joseph M. Kennedy. The principal members of the staff were H. C. Cammack, treasurer; Dr. William P. Hort, assayer; Philos B. Tyler, coiner; J. Bertrand, weighmaster, and Dr. John Leonard Riddell, melter and refiner. From various documents we learn that the Mint was not functioning properly prior to Riddell's appointment, that there were technical as well as political difficulties involved.

Riddell was inexperienced in metallurgy and was given meager directions for processing silver and gold. The first serious occurrence was on January 11, 1840, when there was a considerable loss of silver and gold when glass vessels burst while being heated on a flat, unprotected sand bath. Riddell did succeed in preparing silver ingots suitable for coinage, but had much difficulty with gold.

What we would now term labor troubles led to Riddell's second controversy at the Mint. He discharged two workmen, Peter I. Levick and Ewald Ernst, on the grounds that they were incompetent, but made the error of indicating that he wanted one of the positions for his brother George. Since his brother Samuel had been appointed foreman in the separating room at the Mint the question of family patronage naturally arose. Levick and Ernst appealed to R. M. Patterson, Director of the Mint in Philadelphia, Pennsylvania. Ernst accused Riddell of making a bargain with his workmen so that they would give up a portion of their wages to him. Superintendent Joseph M. Kennedy investigated the charge, and found it to be completely false.

The major incident arose from Riddell's failure to promote Dr. John McCarthy. McCarthy, an apothecary from Cork, Ireland, was a graduate of the Medical College of Louisiana, Class of 1839. Riddell hired him as a laborer in his department at the Mint. Why this was done, we do not know. After a few months McCarthy wanted a promotion, but Riddell did not think he deserved one. McCarthy began to

> "spread most slanderous falsehoods in relation to my official doings."
>
> *Personal Journal,* vol. 18

McCarthy left the Mint but continued to spread accusations against Riddell. He accused him publicly of default, incompetence, stealing and cowardice, and insinuated that he had murdered his wife. Riddell threatened legal action for slander, but the situation was too tense for that, with articles in some of the newspapers accusing Riddell. Riddell had his accounts checked and published the report of the Treasurer, who found everything in order. On the advice of friends, Riddell, his brother George and a workman in his department named Nixon, sought out McCarthy, and Riddell accordingly

> "chastized him on the piazza of his boarding house."
>
> *Personal Journal,* vol. 18

McCarthy promptly charged Riddell in Criminal Court with assault and battery. Riddell was convicted. McCarthy also brought a civil suit for damages. Judge Canonge of the Criminal Court assured Riddell that he would not be imprisoned but fined, since he felt Riddell was too valuable to the Mint to be jailed. Sentence was deferred pending conclusion of the civil action. Records on the final disposition of the case cannot be located.

All of these incidents reached Dr. R. M. Patterson, Secretary of the Treasury Levi Woodbury, and President Martin Van Buren. The exact charges which were made against Riddell were as follows:

> ". . . The President had directed a statement of the charges made against you to be transmitted to you for your explanation. They are as follows, viz:

"1. That you have unnecessarily quarrelled with and discharged your workmen — that you have lost the regard of your fellow officers and that you have not succeeded in preserving in the Mint the harmony and good feeling so much to be desired and without which the operations of the Mint must be retarded and the situation of the other officers rendered unpleasant.

"2. That you have given bad ingots to the Coiner and do not seem to be able to make them better.

"3. That the day after the examination of the contents of your Vault by the Treasurer, you went accompanied by your brother and one of your workmen to the lodging of Mr. McCarthy formerly one of your workmen, who had left the Mint, and whipped him very severely — that this transaction has brought disgrace upon the establishment and subjected you as well as those who accompanied you, to a criminal prosecution.

"Your early attention to such a course of explanation and refutation as these complaints seem to require, is desired. . ."

Levi Woodbury to J. L. Riddell,
June 24, 1840,
National Archives, Fiscal Section

The formal statement of these charges climaxed two months of internal feuding in the Mint. An exchange of letters between the superintendent of the New Orleans Branch Mint, Joseph M. Kennedy, and R. M. Patterson, the Director of the Mint in Philadelphia, Pennsylvania, and between Patterson and Levi Woodbury, Secretary of the Treasury, reveals much discontent and difficulty. The failure of the Mint to produce adequate gold coins from the gold supplied to it was the chief difficulty, and all of the personal antagonisms were related to this. The complete correspondence is given in the *Appendix*.

Riddell sought the origin of some of the charges, and found that Kennedy and the treasurer, Cammack, transmitted them to Dr. Patterson, although Kennedy denied it. On July 14, 1840, Riddell wrote a lengthy letter to Levi Woodbury in his own defense, taking each phrase of the charges and documenting his reply with letters. All of the officers of the Mint except the coiner, Tyler, came to Riddell's defense. Riddell and Tyler were having a running feud over the processing of gold ingots, for Tyler had rejected most of the gold submitted by Riddell. Riddell wanted to experiment with the method of preparing the ingots, and use some of Tyler's equipment, but was refused, time after time. The matter was finally submitted to Dr. Patterson, It was found that Riddell was not using the approved method for preparing the gold, that he had not been given the specifications which were sent from Philadelphia to New Orleans. Also it was found that Tyler was not completely correct in his methods, so that there was error on both sides.

The gold controversy was but a part of the larger group of charges. Patterson recommended to Woodbury, July 27, 1840, that the matter be dropped, even though he expressed violent disagreement with Riddell's personal chastisement of McCarthy. Riddell was backed in the McCarthy incident by Dr. Edward Hall Barton, Dr. James Jones and the weighmaster Bertrand.

Dr. Edward Hall Barton's defense of Riddell is important because Barton was a former dean of the Medical College of Louisiana, and a distinguished scientist in his own right. He wrote to Dr. R. M. Patterson, July 17, 1840:

"I take the liberty of addressing you in relation to the 3rd charge made against Dr. Riddell of the Mint of this place. I should have done so before had I thought the charge itself worthy of notice. Having known Dr. R. for many years — having served with him in the faculty of the medical college for four or five years — having seen him in every relation in which one gentleman can see another, my opinion can be put in the same class with the estimate of my character.

"I can then say in brief, that standing as he did in relation to the fellow McCarthy, and taking into account the mode in which public is formed here — Dr. Riddell could not in safety have acted otherwise as he did. You, sir, are fully aware of the value of character; I need not say then how you should and would feel were you assailed as a robber — a defaulter, with every approbrious epithet, by a fellow of fictitious reputation, who not content with verbal slander, sought to blight your name through the public press.

"Dr. Riddell consulted me in regard to the appropriate course of conduct for him to pursue. Though one of the last to advise a resort to violence of any kind, I stated to him that it was his duty to his reputation and the

safety of his sureties first — to prove to the public that the charges were false and malicious libels, which he promptly did by having the whole of his bullion weighed and accurately examined; and then, that as there was but one way of reaching the wretch, and that was through his corporeal feelings, it was due to him so to punish him. A suit for libel or scandal would have been a mere mockery and would have given the fellow an importance he would not reach any other way.

"It was my conviction and is so still, that Dr. Riddell in this community could have acted in no other way — and I do verily believe that he is completely justified in the opinion of all honorable men here.

"I was astonished to see the scandal made of it by his opponents, but it must have been excessively misrepresented, to have reached the dignity of a notice by the Government! Any wretch, however contemptible can "prosecute," but it belongs to our courts of Justice to convict or justify.

"Excuse the trouble I am giving you in calling your attention to this disgraceful charge, and believe me sir, that it is as unworthy of Riddell as of you or myself.

"With respect to Dr. Riddell's scientific qualification he has not his superior in this community; and if he cannot always make himself as agreeable as others, it is because he has sacrificed the specious to the solid; — and though he may want some of the gilding of social intercourse, he has the solid ore of substantial good feelings — of extensive acquirements and unquestionable integrity."

Dr. Edward Hall Barton to R. M. Patterson,
National Archives, Fiscal Section
July 17, 1840

The entire matter was reviewed by Levi Woodbury and by President Van Buren. No reply was sent to Riddell, so he concluded

"I may regard myself as safely over one more sea of difficulties."

Personal Journal, vol. 19

Actually there was a certain amount of politics involved, since Cammack the treasurer was a Whig, and since

"... the Democratic papers have begun to make comments on the Whig officers of the Mint..."

Personal Journal, vol. 19

Riddell wrote Van Buren and expressed his hope that the situation would not affect Van Buren's political future.

While Riddell may have been ignorant of accepted practices in preparing gold ingots, he did improve the accepted method for silver. He reported to Dr. Patterson that he used a specially designed cast iron pot holding 15,000 ounces instead of the 1,600 ounce size previously used. This proved quite satisfactory, and was used at the Branch Mint as late as 1902. His gold process, outlined in his defense, July 14, 1840, was, according to Patterson, not in compliance with Mint specifications.

During the late summer of 1840 Riddell journeyed northward, essentially on Mint business, but combined this with many visits. He traveled on the Pontchartrain Railroad to Lake Pontchartrain, by packet to Pascagoula, Mississippi, by stage to Mobile, Alabama, Montgomery, Alabama, Columbus, Georgia, Augusta, Georgia, Greensboro, North Carolina, Charleston, South Carolina, by boat to Wilmington, North Carolina, by stage to Petersburg, Virginia, Richmond, Virginia, and finally Washington, D.C., Baltimore, Maryland, and Philadelphia, Pennsylvania. He kept a detailed expense account on this trip, even noting $0.13 for sightseeing at the Washington Monument, and the purchase of a silk hat in Washington.

His visit to Philadelphia was essentially to confer with Dr. Patterson and others at the Philadelphia Mint to clear up some of the difficulties in the processing of silver and gold. He was much pleased with his reception at the Mint. Dr. Patterson took him to meetings of the American Philosophical Society, and he attended the sessions of the Academy of Natural Science. One of the new acquaintances made at the Philosophical Society was Caleb G. Forshey, a geologist from Natchez, Mississippi. Riddell and Forshey were to work together later on a geological survey of Louisiana. Riddell was entertained at a party on September 11, 1840, by Dr. S. G. Morton. All of the prominent scientists of Philadelphia were there, including the botanist Thomas Nuttall whose work Riddell had used while in Cincinnati. The party was quite elaborate, with, as Riddell noted,

"hock and madeira wines, ice cream, grapes, apples, pears, peaches, sugar cakes, etc."

Personal Journal, vol. 19

On his return journey Riddell visited Secretary of the Treasury Levi Woodbury in Washington, and made a special trip to visit President Martin Van Buren out in the country near Washington. In spite of his difficulties at the Mint he asked Woodbury to defray his expenses, since he was on Mint business. Apparently the Secretary agreed to do so, for reference is made to it later.

On the return Riddell traveled from Washington to Wheeling, West Virginia, then to Columbus, Ohio and Cincinnati, Ohio. He met John Tyler, later president, on one of the steamers and, another traveling companion was General William H. Harrison. He learned en route that Catherine Burr had married a clergyman, Reverend Ufford, of Gambier, Ohio.

His visit to Cincinnati was rather unpleasant. Just why he stopped there is not clear, for he had not forgotten how his medical colleagues had treated Mary on the occasion of their marriage. He had not forgiven them for their

> "slanderous misdeeds of the past."
> *Personal Journal,* vol. 19

He met Dr. William Wood, Dr. S. D. Gross and the botanist William Starling Sullivant, but Dr. Daniel Drake was out of the city.

At Cincinnati he decided against a trip to Louisville, Kentucky, and took a stage for St. Louis, Missouri, where he boarded a Mississippi River packet. After many delays he reached New Orleans on October 12, 1840. He recorded that the trip had cost him $518.32.

A year later, Riddell proposed to Superintendent Kennedy that slave labor be used in the melting department of the Mint. He reasoned that most of the duties now carried on by his three laborers could be performed by slaves – carrying coal, tending furnaces, removing ashes, lifting pots from furnaces, sweeping, etc. – and added, that in the hot summer months, the "Creole blacks" would stand the heat better than white laborers, would need no summer vacation, and also would save $720.00 a year. Riddell also felt that the employment of slave labor would reduce the danger of robbery since the slaves could be guarded and restricted. This was a unique position for a New England Yankee to take; especially one who a few years before was not certain he would remain in the South. Kennedy's action on the request is not known.

Another political difficulty confronted Riddell in April, 1841. In a letter to Thomas Ewing, then Secretary of the Treasury, Riddell states that

> "... I would not obtrude myself upon you had I not observed this morning in one of our less respectable city papers, an article wherein I was mentioned among others as being obnoxious to Mr. Webster's late circular – falsely charging me with having been an active partisan during the late Presidential election, and having influenced the votes of the men engaged in my department."
> J. L. Riddell to Thomas Ewing,
> April 8, 1841, National Archives,
> Fiscal Section

Riddell continued with a refutation of the charges, indicating that the only political gathering he had ever attended was a ward meeting, and then did not participate in the discussions. He was anxious, however, to learn whether or not he would be replaced as melter and refiner. A letter to Ewing from Silas Reed, dated April 29, 1841, requests that Riddell be continued in office:

> "If you have no conclusive evidence that Doct. J. L. Riddell ... has been a political partizan and in any way prostituted the official trust reposed in him, I hope he will be continued in office. He is a gentleman of high literary and scientific attainments – of good moral character, and a business, industrious man. In point of qualification, industry and integrity, I apprehend no one is his superior. I knew him several years in Cincinnati – and his name is honorably connected with the botany, geology and mineralogy of the West."
> Silas Reed to Thomas Ewing,
> April 29, 1841, National Archives,
> Fiscal Section

These letters apparently cleared up this difficulty.

On November 6, 1841, Riddell wrote to President John Tyler, asking to be informed if any charges were prepared against him. He noted in his letter that

> "I have reason to believe that attempt has been or will be made to prejudice my standing with you; for no other real reason than that I have disobliged some of my late friends by refusing to loan money; but for the falsely alleged reason that I have not made a satis-

factory settlement of my silver account."
J. L. Riddell to John Tyler, Nov. 6, 1841,
National Archives, Fiscal Section

He continued to outline the controversy, that Kennedy did not agree with one item in the assayer's certificate which Riddell insisted was correct. The dispute had been referred to Dr. R. M. Patterson for settlement.

His term as melter and refiner at the United States Branch Mint came to an abrupt close December 4, 1848, when Robert J. Walker, Secretary of the Treasury, wrote Riddell a curt note of dismissal, and notified Superintendent Kennedy of his action at the same time. Riddell was not too unhappy about his dismissal, but became annoyed when he was unable to find out the reasons for it. Secretary Walker refused to reply to his letters. On March 31, 1849, Riddell wrote to Walker's successor, William M. Meredith, as follows:

"I held the office of Melter and Refiner in the Branch Mint at New Orleans, from 1839, until the close of 1848. In the month of December 1848 I received from your predecessor, Mr. Walker an unexpected and unexplained notice of removal from office. After settling my accounts, I addressed Mr. Walker a note, asking for a transcript of charges, or statement of the causes, producing my removal. Receiving no reply, on the 17th of Feb. 1849 I again addressed Mr. Walker, a letter, apprising him that unfounded slanderous rumours affecting my reputation had arisen in the premises, and conjuring him as a matter of justice to communicate to me any and all charges that may have been preferred, in order that I might set myself right. I have still received no reply.

"I therefore address you, as his successor in office, this note, asking that I may be furnished with copies of any letters on file in the department, from which the propriety or necessity of my removal was based. If on political grounds, I am satisfied. But if on assinuations that affect my reputation, then I shall desire that the matter be duly inquired into."

J. L. Riddell to W. M. Meredith,
March 31, 1849, National Archives,
Fiscal Section

There is no record that a reply was received in this instance either.

The faculty of the Medical Department of the University of Louisiana, the successor to the Medical College of Louisiana, was also concerned about Riddell's dismissal. On March 29, 1849, Dr. Gustavus A. Nott wrote to Secretary Meredith as follows:

"Dr. Riddell late melter and refiner in the U. S. Branch Mint at New Orleans has recently been removed from office without any reasons publicly assigned therefor.

"Dr. Riddell is a member of the medical faculty of the University of Louisiana. Reports are rife in the community that he has been removed from the aforesaid office for malfeasance or malpractices in the discharge of its duties. These reports have been brought before the medical faculty in a manner to enforce their consideration, and they have appointed a committee to investigate the charges. I am chairman of that committee. Its object is to ascertain facts. If the character of Dr. Riddell is suffering unjustly we feel it our duty as his brother professors to come forward in his defence. On the contrary if these allegations are true, we feel it no less a duty, to protect ourselves from an association with one rightfully accused.

"Dr. Riddell states to us that he has written twice to the Department, without receiving any reply. Will you have the kindness to furnish us with any information you may feel at liberty to communicate, which has come within your knowledge officially, relative to the removal of Dr. Riddell from office."

Dr. G. A. Nott to William Meredith,
March 29, 1849, National Archives,
Fiscal Section

No action was taken by the Medical Faculty, or by the Board of Administrators, of the University of Louisiana, against Riddell, so we conclude that Meredith ignored Nott's letter as well as the others.

XII. NEW ORLEANS – 1840-1846

Even though he enjoyed a professorship at the University of Louisiana, and a responsible position at the Branch Mint of the United States, Riddell was not completely happy in New Orleans. He was in the best financial condition of his entire life, not only with his own income and investments, but with the property inherited from his wife. He noted in his *Journal* on February 20, 1840, that

"I bought for cash on Monday, before Marks, (Joseph B. Marks) notary public, a negro boy George."

Personal Journal, vol. 18

He was also able to send his brother George $100.00 for his education, pay the installment on the mortgage on his mother's farm in Preston, and send money for brother William's schooling, as well as gifts to his sisters and brother-in-law.

His feelings of unrest and dissatisfaction are expressed in his July 19, 1840, entry, just at the close of the early Mint troubles:

> "Ten years have blunted my acute pleasurable feelings very much, but have not lessened my ambition. The objects of my ambition have become more defined and restricted. Poetry I have long since wholly given up. The study of nature is what I excel in. Let me but carry out one half of the plans I have formed – let me accomplish one half of the researches I have proposed to myself, and I shall then feel more satisfied."
>
> *Personal Journal,* vol. 18

Frequently he complained about excessive work at the Mint, and not enough time for personal reflections and reading.

> "I am so annoyed by the responsibility of my situation as Melter and Refiner that I find little leisure for reading or writing, and am unable to make much progress in any of my projects."
>
> *Personal Journal,* vol. 19

In spite of these complaints Riddell was preparing herbaria and drying plants, he was doing independent chemical analysis (such as testing a negro's stomach for arsenic for Glendy Burke, a prominent citizen), and testing the black vomit of yellow fever patients.

The Geological Committee of the State of Louisiana became a reality in 1841, with John Leonard Riddell as chairman, and Dr. W. M. Carpenter, Dr. Thomas Ingalls, Dr. Josiah Hale, Caleb G. Forshey and P. E. Trastour as committeemen. The members of the Committee were supposed to serve without pay, but after submission of their report Trastour sent the Legislature a bill for his services. Not to be left out, Forshey and Carpenter also presented bills. The Governor was greatly annoyed, and appealed to Riddell for assistance. After much discussion the Legislature did appropriate $2500.00 for each of the Committee members. All of the documents which had been turned over to the State Printer were lost before publication. The specimens collected were assembled in the Medical Department of the University of Louisiana, where they were confiscated by the President of the University, Dr. Francis Lister Hawks, and later sent to New York by one of the faculty members, Dr. Charles A. Luzenberg.

An interesting note on a family matter is given in detail in Riddell's *Journal.* At the time of Mary Riddell's death she was buried in the Protestant Cemetery (Girod Street) annex. Two years later Riddell noted that it was necessary to transfer the remains of Mary, the Schragers and their first child John, into a new location within the main cemetery. He drew sketches indicating the location of the tomb, and a drawing indicating how the remains were placed within the tomb.

Additional evidence of his financial success is indicated by his purchase of farm lands in Texas and in New York, and the purchase of a second slave.

> "I bought a mulatto man, cook, etc. for $670 cash. His name is Steward."
>
> *Personal Journal,* vol. 19

He leased his New York lands to his sister Julia Ann and her husband, John Brown.

As was noted earlier, on the journey during the summer of 1840 Riddell met John Tyler and his son. There are frequent references to exchanges of letters between Riddell and young Tyler. His friendship with Harrison and with Tyler made him fairly secure in his position at the Mint in spite of the charges made against him.

Riddell's *Personal Journal* was neglected during the forties, and there are no volumes of the *Repository* after 1835. His scientific speculations were mixed with personal reflections and notes. Entries were sparse.

In the course of his extensive correspondence with Dr. R. M. Patterson at the United States Mint, Philadelphia, Pennsylvania, Riddell suggested that Patterson ask the American Philosophical Society to publish his material on Texas plants, with colored copperplate engravings. Patterson did not look favorably on the idea.

A letter from Riddell to Dr. John Torrey, distinguished botanist, reveals Riddell's desire for continued recognition in this field:

> "Your favor apprising me that you had sent a Package of Books per ship Alabama came duly to hand. Neither the Captain of the ship nor the agents here can give any account of the package. May it not have been sent by some other ship?
>
> "I procured many new species of plants among the San Saba Mountains and in Western Texas — Was absent three months, returned 9th Dec. I took copious notes where the plants grew. Going horseback could not often take duplicates. I shall send you such as I have.
>
> "Query: Where I furnish you a satisfactory description of a new plant, in accordance with the plan of your flora, will you let it appear in your flora, in my name — after the manner of Nuttall's Rocky Mountain plants? . . ."
>
> J. L. Riddell to Dr. John Torrey, February 9, 1840, Academy of Natural Science, Philadelphia, Pennsylvania

On March 20, 1842 Riddell wrote to Dr. George Engelmann:

> "Your favor of February 8th came to hand a week or two since. I shall be very happy to correspond with you hereafter, sending you the productions peculiar to this region for those of Missouri.
>
> "I have on hand several samples of *Cascata* obtained by me in Texas, which with excerpts from all I have I will send you in time for your monograph — so soon in fact as I get time to look over my unarranged specimens."
>
> Engelmann letters, Missouri Botanical Garden, St. Louis, Missouri
>
> March 20, 1842

During 1843 Riddell was crystallizing his views on the constitution of matter and contemplating meteorological problems, such as the origin of storms, tornadoes and water spouts. He designed a modified reflecting telescope and some semi-cylindrical lenses. His periodic speculations about aerial navigation continued.

In 1844 we find Riddell preparing a book on coins, and formulating tests for the specific gravity of coins, real and counterfeit. *The Monograph of the Silver Dollar* was printed in Cincinnati by E. Shepard, under Riddell's personal direction. The book contains over five hundred facsimile impressions of American and Mexican dollars and half-dollars, genuine and counterfeit, with assays. The book is a collector's item for numismatists today.

Riddell was appointed to the State Flood Prevention Committee by the Governor of Louisiana in 1844,

> "to devise a means of protection for New Orleans against the inundations of the Mississippi River,"
>
> *Dictionary American Biography*, 1935, vol. 15, pp. 589-590

and a year later was a member of a committee of three appointed by the Association of American Geologists and Naturalists

> "to ascertain the amount of sediment carried into the sea by the Mississippi River."
>
> DeBow's *Commercial Review* 1846, vol. 2, p. 434

Riddell's paper, "Deposits of the Mississippi and Changes at its Mouth" was read before the Association in 1845, and later published in DeBow's *Commercial Review*. He estimated that 119,250 years were required to create the Mississippi delta. He made many calculations of sedimentation and on several occasions measured the depth of the river at various locations. One of his original plans showing the varying depth of the river in front of his residence (May 12, 1849) has been preserved in the archives of the Howard-Tilton Memorial Library, Tulane University. These studies, some of them with Caleb G. Forshey, culminated in two papers: "Sedimentary deposits of the Mississippi", in DeBow's *Commercial Review* (mentioned above) and "Remarks on the dynamics of the Mississippi River and other matters pertaining thereto," a pamphlet printed in New Orleans. During this period Riddell was also an active member of the Physico-Medical Society of New Orleans.

Another long summer trip was taken in 1844. He left New Orleans by steamship for New York, stopping at Key West, Florida, and Charleston, South Carolina. He spent several days with his mother in Preston, giving her $500.00 for her home and $150.00 for other purposes. Riddell then visited his birthplace, Leyden, Massachusetts, his old home in Colerain, Massachusetts, then Boston and New York. While in Leyden he visited his relatives and determined the genealogy of his family.

There is a bit of mystery concerning Riddell's second marriage, if there was one.

No mention of it is made in his *Personal Journal* nor is there any record of it in the archives of the City of New Orleans. The Riddell *Family Genealogy*, prepared by William Pitt Riddell, John Leonard's brother, and edited by John Leonard Riddell, was printed in 1852, and lists the second marriage to Ann Hennefin, with children Edward Henry, born November 18, 1841, and John William, born December 2, 1844. The births of the two children are recorded in the *Personal Journal*, but not the marriage, leaving speculation about the possibility that Ann Hennefin was Riddell's mistress. This is quite likely the case, since prior to his marriage to Angelica Eugenia Brown in 1846, he refers in his *Journal* to Mary, and how happy they were together, and indicates that he had been a widower for six and a half years.

To substantiate the speculation about Ann Hennefin it will be noted that at the time of the settlement of Riddell's estate the two children mentioned, Edward Henry and John William, were not listed as heirs (1867). When the *Genealogy* was prepared, in 1852, John William was listed in Preston, New York, with his grandmother. Edward Henry was in New Orleans, and was educated by John Leonard at Jefferson College. He later married and two of his children were buried in the Riddell tomb, Edward and Holma Peter Riddell.

One of Riddell's characteristics was his stubbornness. When he established, to his own satisfaction, that a scientific interpretation was sound, or that one of his own experiments was correct, he would stand behind that decision even if proved wrong to the satisfaction of others. Two major disputes over scientific matters took place in the forties. One was an exchange in the local newspapers during October, 1843, with R. O. Davidson over Davidson's plan for a

> "flying machine which he calls an aerostat."
> *Personal Journal,* not numbered

By means of a notice in the *Morning Herald,* Riddell was "invited" to comment on Davidson's project. He was not interested in the publication of his findings, but Davidson insisted. Riddell's calculations, based on the principles of falling bodies, showed that the project would fail. He wrote:

> "In examining your scheme I have become perfectly convinced that it is impracticable for a man to fly by his own muscular power, unaided by a buoyant gas, no matter what mechanical contrivance he may invent to serve him."
>
> *Personal Journal,* not numbered

Davidson did not appreciate the reply, and countered with:

> "But unfortunately for your deductions and conclusions they arise out of an examination of the mere physical and not the intellectual characteristic of my project."
>
> *Personal Journal,* not numbered

Davidson's designs attempted to imitate the flight of birds, and not falling bodies. He then claimed the "impropriety" of Riddell's mode of investigation, and thought it had reflected unfavorably on his project. The controversy was followed in the newspapers for two months, with Riddell philosophizing on the relationship between the flight of birds and their physiology.

XIII. SCIENTIFIC ACHIEVEMENTS – 1839-1850

Phosphorescent Taper

Riddell recorded:

> "Melted beeswax in spoon, dropped in piece of phosphorus until diffused. Poured into hollow paper cylinders, ½ inch in diameter, 2 in. long. When cool the cylinder continued to look luminous in the dark, so long as there remained any of the phosphorus exposed to the air. But at anytime by rubbing the end of it upon a board, it would become luminous. Can be carried in pocket without danger of fire."
>
> *Personal Journal,* vol. 7

Pocket Compass

Riddell wrote:

> "I have hit upon an easy mode of constructing a pocket compass.
>
> OC represents a quill barrel. At O the end is closed with sealing wax; at C, a cork, closing the other end. S is a small lead shot; NS represents a magnetized sewing needle (No. 8). The point is toward S. A spear head is fastened on N for the north pole.

> "C has a horizontal perforation for inserting the needle. To make use of it first remove the cork; next, take out the needle, then replace the cork and run the needle through the perforation.
>
> "Lastly place it in still water and the quill, still standing erect, will sink down so that the surface of the water will be at W. The needle will now readily traverse and almost at once settle down to N and S polarity. I varnish quill, needle and all with black Japan varnish. It seems to me that this single contrivance may prove highly useful to hunters, Indians and travellers. It is certainly more portable than anything of the kind ever before contrived."
>
> *Personal Journal,* vol. 18 (April 5, 1839)

These letters refer to an accompanying diagram in the *Journal.*

Typewriter

The typewriter as we know it was not developed until 1868, but the idea of such a machine was proposed by Riddell in his *Journal,* May 29, 1831.

> "I planned a writing machine – intended to have it go by keys – so constructed that letters might be impressed as rapidly as keys could be touched with the fingers of both hands. I supposed that fair letters resembling printing might be made nearly fast enough to keep up with a speaker."
>
> *Personal Journal,* vol. 18

This machine did not go beyond the planning stage, but there are references indicating that Riddell wished he had completed the machine. On August 25, 1842, he wrote:

> "I have again been thinking of an expeditious mode of extemporaneous printing by means of keys and mechanisms . . . thirty keys to a row . . . fifty such rows . . . enough to furnish a line on a book or manuscript by taking a letter or blank from each."
>
> *Personal Journal,* vol. 19

There were preliminary construction sketches, but nothing was ever made. To my knowledge Riddell has never been associated in any way with the invention of the typewriter, yet the idea seems to have been his many years before the actual invention. Riddell's ideas do not antedate the British patent of 1714 which some regard as evidence of the first machine, but his thoughts precede the designs of Charles Thurber and Sir Charles Wheatstone.

Fishrod Balance

This instrument was constructed in 1840 and reported in the *American Journal of Science and Arts* in 1858.

> "I formed a minute tapering hollow tube of glass, mounted it adjustable in a glazed case to avoid drafts of wind, suspended from the small and free end an extremely light pan by a thread of glass, terminating in an indicator point, the point traversing over a micrometer scale, a view of which was commanded by a microscope."
>
> *American Journal of Science and Arts,* 1858, vol. 26, p. 71

Riddell stated that he had operated this balance for some years and that its operation was witnessed by "hundreds of people now living." The instrument was "delicate and reliable" and was used to determine the amount of non-volatile matter in liquids, which gave films too minute for an assay balance. Riddell admitted that the balance was not too accurate, because repetition did not give comparable results throughout the year.

Views on the Constitution of Matter (Atomic Theory)

The first indication of interest in the atomic concept of matter was given in a lecture at Worthington, Ohio, on June 24, 1833. From that time until 1850 Riddell's notebooks are filled with his interpretations of the constitution of matter. These notes reveal that Riddell believed that matter was composed of atoms, and that each atom was in turn composed of an infinity of particles, and that these particles were composed of an infinite number of smaller particles, *ad infinitum.* He regarded the sun and earth as atoms, and attempted to link up the solar system with the atomic system.

Riddell's paper "The probable constitution of matter and the laws of motion as deductible from and explanatory of the physical phenomena of nature" is based on the following propositions:

1. "Matter is any thing real, which occupies by itself length, breadth, and thickness in space.
2. "Matter exists aggregated into spheroids or atoms forming in respect to the dimen-

sions of the different terms of atoms an indefinite series, probably geometrical, in which each atom is composed of an aggregation of an indefinitely great number of atoms subordinate in the series with respect to size . . . Let

M = a visible, material sphere, like the sun or earth

$\bigcirc$ = any ratio, infinitely small

$\sim$ = any ratio, or quantity, infinitely great

∞ = any ratio, or quantity, indefinitely great

then the material series may be written in geometrical proportion thus:

$$M \sim : M : M\bigcirc : M\bigcirc^{2} : M\bigcirc^{3}$$

$$: \ldots : M\bigcirc^{\infty-2} : M\bigcirc^{\infty-1} : M^{\infty}$$

"Here

$M\bigcirc$ = a molecular atom, such as oxygen or any other of the so called chemical elements;

$M\bigcirc^{2}$ = a more attenuated matter, probably such as an atom of the luminiferous medium;

$M\bigcirc^{3}$ = matter probably instrumental in producing the phenomena of attraction;

$M\bigcirc^{\infty}$ = the unassignable, transcental last term of matter.

". . . to assign a last term of matter on the scale of minuteness would be to set limits to a subject which wears every aspect of infinity. Whatever we call great or small, cannot be absolutely great or small; only relatively so. And if there be an assignable ultimate atom of matter, no reason can be given why it should have any special limit of dimensions. Admit its existence and then comes the natural inquiry as to its theoretical divisibility; which affirmatively forcing itself upon our conviction, we are again compelled to assent that there cannot be assigned an ultimate term of matter.

3. "Around each material atom or aggregated sphere, there lies a sort of atmosphere or medium, consisting of diffused atoms belonging to the subordinate terms in the material series.

4. "Matter is inherently inert, or posses what has been called vis inertiae; by which is meant that matter can neither of itself begin to move, nor cease to move when set in motion.

5. "Matter is indestructible.

6. "Matter is inherently and necessarily possessed of no qualities, unless its extension, mobility and inertness be called qualities.

7. "Motion, existing in time, (of which it is the cause and measure) is the translation of matter through space.

8. "Motion is the source of all qualities, and the proximate cause of all phenomena which matter exhibits.

9. "Momentum is physically indestructible and uncreatable.

10. "Momentum is transferable from matter to matter solely by impact or collision."

New Orleans Medical and Surgical Journal, 1846, vol. 2, pp. 592-623

In this paper he discusses impulse, the indestructibility of motion, the motion of the fixed stars, attraction, gravitation, molecular repulsion, capillary attraction, elastic collisions, gaseous diffusion, the nature of heat, density of gases, and includes a calculation of the time required for a single molecular oscillation in air!

The paper is tedious and on occasion faulty in its reasoning and general logic, but Riddell's picture of the atom, that it is composed of smaller particles, and that these particles are held together by "lines of force" is indeed unique because it is our present-day picture predicted many years before the discovery of our atomic particles.

His concept of momentum is indeed correct, representing that quantity by the product of mass and velocity, but the concept of force is erroneous. His statement

> "The terms force and power, though often vaguely used, mean generally momentum,"
>
> *New Orleans Medical and Surgical Journal,* 1846, vol. 2, pp. 592-623

is completely wrong.

A few additional paragraphs to elaborate on his picture of the atom may prove of interest:

> "Each atom is supposed to be surrounded by an atmosphere of calorific and electrical matter. This subtile envelope of ethereal matter as it has been termed, is self-repellant, though attracted by the atoms which it surrounds. Its presence, however, renders the atoms mutually repulsive, a quality which does not fail to manifest itself, wherever from proximity or other cause it has the ascendancy over the inherent corpuscular attraction."

> "Atoms enveloped in similar electric fluids will have a disposition to repel each other; if dissimilarly electrified there will be a tendency to mutual attraction."
>
> *Repository,* vol. 6

Riddell's publication received the following press notice from the editors of the New Orleans *Commercial Bulletin:*

> "On the Constitution of Matter, by Prof. Riddell, is written with care and perspicuity, and will doubtless attract much attention. With some additions, it is a systematic arrangement of the peculiar philosophical principles of the writer, heretofore announced in the columns of the *Commercial Bulletin.* Though much controverted, his philosophy is deserving of a careful examination and will attract attention from the ingenuity and ability with which it is maintained."
>
> New Orleans *Commercial Bulletin,* 1846

The Ely-Riddell Controversy

In January, 1846, one of the significant controversies of a strictly scientific nature involving John Leonard Riddell arose. The issue was Riddell's presentation of the "Constitution of Matter", in lecture and publication. The newspapers carried lengthy arguments and detailed rebuttals, until the editors finally grew tired of the debate and dropped the issue.

The discussion began with a criticism of the Riddell point of view concerning gravitation and matter, printed in the New Orleans *Commercial Bulletin,* and signed "E". Riddell immediately answered, whereupon "E" attacked the answer. The exchange occupied almost the entire month of January. "E", we know from later publications, was Dr. Albert Welles Ely, a brilliant physician and capable scientist in his own right.

In his publications Riddell had stated his theory of "impulsive" gravitation, as opposed to "inherent" gravitation. Riddell favored the "impulsive" interpretation, for he believed that gravity

> ". . . cannot be material, else it would necessarily be inert like other matter. It would require to be forcibly radiated to other objects or bodies proposed to be affected by it; in which case it would necessarily produce repulsion rather than attraction. . .
>
> "If gravity be not matter, then it cannot be conceived to exist in space, and if it does not exist in space, it exists nowhere, and must be nothing. Gravity cannot be abstract motion or momentum, for motion or momentum obviously can have no existence separate from matter moving. . .
>
> "The force of momentum giving origin to the phenomenon of gravity must therefore have had an equivalent congeneric antecedent existence, essentially in the direction of the body moving in obedience to it."
>
> *New Orleans Medical and Surgical Journal,* 1846, vol. 2, pp. 592-623

This, to us today, seems to be so much nonsense. Ely thought so also, and ridiculed Riddell in scorching terms:

> "He disavows the necessity of the motion of matter, he eschews the philosophy of Newton and LaPlace, as to the cause of motion — he declares the doctrine of universal inherent gravitation as an absurdity, what then will he assign as the causes of the impulses of motion in his ponderefacient medium? Is it more satisfactory or simple then to explain natural phenomena by Prof. Riddell's theory than that of Newton? Does the new theory point out and supply any deficit in the old one? Assuredly not."
>
> *New Orleans Medical and Surgical Journal,* 1846, vol. 3, p. 3

Concerning the arguments for the existence of gravity in space, Ely comments

> "This, if true, proves too much; for it would prove the nonexistence of mind. Mind is not matter, yet it exists in space, and operates upon things in space."
>
> *New Orleans Medical and Surgical Journal,* 1846, vol. 3, p. 3

Ely frankly admits that

> "gravitation is one of the profound mysteries of nature — the instrument by which the Creator propels through space the countless worlds of the Universe. It is as mysterious as mind; and it is no more absurd to suppose its existence as a powerful active principle pervading all matter, than to suppose the existence of mind.
>
> "Professor Riddell rejects inherent gravity because he cannot comprehend it, and tries to in its place material impulses of motion — but unfortunately here too he meets with something which he cannot comprehend — the cause of his impulses of motion. He is therefore compelled to stop. . ."
>
> *New Orleans Medical and Surgical Journal,* 1846, vol. 3, p. 3

Commenting on Riddell's publication of the "Constitution of Matter" Ely summarizes the important points of the paper, adding his

own phrases. He believed that the Riddell theory was based upon:

1. ". . . a theory of the constitution of matter of which we know absolutely nothing and never can know,
2. "an extremely subtile ponderefacient medium the very existence of which cannot be proved;
3. "impulses of motion traversing this ponderefacient media in every direction, thus giving rise to the motion of bodies in space, This is a pure hypothesis of which we know nothing and of which nothing can be proved;
4. "the indestructibility of motion which is not proved;
5. "the doctrine of collision as a means by which motion is communicated from matter to matter which I have shown cannot be true;
6. "that motion is the sole quality of matter – which I have shown to be false."

New Orleans Medical and Surgical Journal, 1846, vol. 3, p. 3

Riddell was not disturbed by this challenge, and merely brushed aside Ely's objections with sarcastic phrases. Ely, of course, hit some of the weaknesses of Riddell's point of view, and was for the most part correct in his interpretation.

Ely did not quarrel over the portion of the paper dealing with the actual structure of matter or the concept of atomic and nuclear binding forces. He accepted, as we do today, the validity of those sections.

The Riddellian Philosophy

In 1846, following the publication of his paper on the "Constitution of Matter", Riddell wrote in his *Journal* his "Philosophy" – or, rather, his views on God, matter, the hereafter and the universe. Some of these points were noted in his publication on the "Constitution of Matter," others are completely new:

1. "That the essence of matter exists, but was never created, having always existed.
2. "That all the motion now pertaining to the matter of the universe always existed.
3. "There can be nothing else besides matter and motion.
4. "That since a universal corelation must submit through the agency or impulse, among all the infinite parts and stems of the universe; the movement of each particle etc indelibly recording itself by an influence on all nature; there must exist a universal consciousness, very properly termed the mind of Deity.
5. "That regarding the transcendental terms of matter there can be no conceivable limit to the velocity of impulse therein, and hence the mind of Deity throughout any conceivable region of space, however vast, appreciates all occurrences within any interval of time however infinitessimaly minute it may be assigned.
6. "That all the laws of nature depend upon the mathematically necessary axioms of impulse.
7. "That the laws of nature are imperative and unrelenting and though I cannot comprehend the subject, yet I cannot but infer that our moral acts are sooner or later productive of effects resulting in exact and absolute justice.
8. "Personal identity is probably not a thing permanent in nature. On this point I do not feel clear and decided. It seems that personal identity and individual existence may be likened unto a lamp or rather the flame of a lamp – a continued succession of like phenomena.
9. "As to future state I cannot for a moment doubt but that the matter and motion I now possess will survive hereafter in perpetuity. Yet I cannot settle in my mind, whether my mind is some aggregation of transcendental matter, which may survive the body or not. I cannot promise myself a future consciousness after death, of this present existence, because I do not now possess any consciousness of having existed heretofore; yet no doubt all of matter and motion which I possess has always existed. It seems to me most reasonable to suppose that, after death, all I am will merge unconsciously into the general universe of matter and motion.
10. "Therefore nothing can here be certainly determined about a future state of existence: by which I mean that if we in a future state (which I doubt) still retain mental identity or a remembrance of events of this life, we have no possible means of foreseeing or foreknowing the particulars of such future existence.
11. "That every present finite form, body or aggregation of matter (globes, chemical elements, etc) had a beginning or origin, and as such will therefore have an end or dissolution.

12. "That stellar atoms have originated by the condensation of nebulous matter; and that this sort of aggregation seems in progress with all that portion of space which has been explored through the telescope by terrestrial observers.

13. "That in other far unseen regions of space, a process the reverse of nebular condensation may be going on: by which stellar atoms are in progress of expansion and dissolution.

14. "That chemical elements are formed by the aggregation under definite circumstances of matter ($m\theta^2$); the variation of circumstances determining the mass and inherent rotary motion of these chemical elements: hence the origin of different kinds of elements.

15. "That this elemental formation must precede and also concur with this nebular condensation into stellar atoms.

16. "That since we found that a cubic foot of space in the air near the sea, contains 1.1 oz. av. of air, we cannot therefore infer that 1.1 oz. represents the whole mass of matter in that space. In fact by this weight we recognize only the $m\theta$ atoms (molecular atoms) while the same space contains also the $m\theta^2$, $m\theta^3$, $m\theta^4 \ldots m\theta^{\infty-2}$, $m\theta^{\infty-1}$, $m\theta^{\infty}$ atoms: an infinite number of terms of matter besides the $m\theta$ atoms above. Hence the actual amount of water in the said cubic foot of space may be far more than what 1.1 oz. would represent. Hence what to us seems a vacuum may contain much matter.

17. "That the necessary laws of nature are such, as to allow of the origin of organized beings; the aggregation of many different terms of matter into such organisms, being under the control of circumstances.

18. "An organized being has absolute individual and material identity but for an inappreciable moment; it has ordinary individual identity during its life as an individual; it has another and less definite identity as a variety; another as a species; another as a genus; and still another as representing all the forms into which it may be developed in the course of time; the latter being perhaps equal in duration to continuance of the globe in a habitable condition.

"That the more attenuated terms of matter have a preponderating influence upon the more gross terms of matter, as $m\theta^2$ upon $m\theta$, $m\theta^3$ upon $m\theta$, etc. So mind, the immediate instruments of which are the transcendental terms of matter, has an influence upon matter. This arises from the greater velocity of impulse in the refined terms of matter compared with the velocity of normal impulse in the grosser medium."

Personal Journal, not numbered (1846)

A curious paragraph from Riddell's *Journal,* following the Ely controversy and the statement of Riddell's philosophy, deserves mention.

> "I do not think there is in, or out of nature, a separate and independent being called Deity; but that Deity is the infinite total of all; the grand organization which includes all others. That I for instance as well as the meanest or most exalted thing known, am an infinitessimal part of Deity."
>
> *Personal Journal,* not numbered

In May, 1846, Riddell announced his concept of molecular matter. He postulated four states – nebular matter, solids, liquids and gases, and characterized them as follows:

1. "Nebular condition, in which the atoms are so remote as not to manifest sensibly molecular attraction or repulsion upon each other, and hence they cannot be considered as constituting a medium able to transmit molecular impulses. . .

2. "Gaseous condition. Molecular attraction feeble, almost insensible, from the remoteness of atoms, yet from the adjacency of the proper atmospheres of each atom, symmetrical position is taken, each atom being ivested by others dodecahedrally and molecular impulses, constituting sound (and essentially heat also) are transmissible. Hence molecular repulsion operative.

3. "Liquid condition. Molecular attraction and repulsion both operative, and mutually counterbalancing; atoms ivesting other dodecahedrally.

4. "Solid condition. Molecular attraction and repulsion operative, polaric attraction and repulsion operative, general tendency of atoms to ivest each other bilaterally or in obedience to the axes of polaric rotation."

Personal Journal, not numbered

Two other illustrations of the Riddellian Philosophy appear in later publications. These reveal a different side.

> ". . . as to the relations of animals and plants among each other it can safely be said that they prey upon each other to the full extent

of their power . . . that as we in the brief day of our actual observation have seen organic individuals begin and end their respective lives; organic varieties as of fruits, etc. appear, flourish, and decay; and even organic species . . . become extinct, as the Dodo and the Irish Elk; so we may infer, from the inspection of the remains of successive extinct races of beings, that all species or kinds, as such, have begun their career, will flourish for we know not how long, and will ultimately decay and disappear; their places to be supplied by modified species and kinds. . ."

". . . and as to simplicity of structure, any one accustomed to the use of a good microscope, can easily assure himself that the simplest structure visible, really possesses a degree of organization which far transcends the defining power of the instrument; so that truly primitive or elementary structure has never yet by human eyes been seen."

"Organized and living bodies can receive, absorb, elaborate and assimilate dead matter from the mineral kingdom; but no authentic instance is yet adduced, among the myriads of scrutinizing observations made, where mineral matter by itself has elaborated and exalted itself into the organized and living condition . . . we may indeed set it down as established that organized matter had its inception with organized matter anteriorly existing; that all living beings are descended from living beings; just as motion is exclusively derived from pre-existing motion, and just as the present material combinations are derived from pre-existing matter."

New Orleans Medical and Surgical Journal, 1852, vol. 8, pp. 468-480

And in the words of Dr. Noah Benedict, secretary of the New Orleans Academy of Sciences, reporting one of Riddell's pronouncements at the October 10, 1853, meeting of the Academy:

"He had no patience with the arrogant assumption that all things in this world were valuable or worthless, only as they may contribute to the interest or gratification of man. He did not believe we have "a prescriptive or divine right to destroy all of the animals, catch all the fish, nor shoot all the birds." He thought there was some unexpressed law controlling the destinies of our own race, in common with those of all animated nature, which, neutralizing all the forecast of political economy, the calculations of science, the resources of art, like a relentless creditor, exacts to the uttermost the conditions of its bond; which by war, by pestilence, by famine, by some strange, merciless catastrophe, at periods neither ill-defined nor remote, sweeps its myriads to the grave."

New Orleans Academy of Sciences, *Minutes* October 10, 1853

These extracts give a clear picture of Riddell's concepts on a variety of subjects, points of view which he adhered to strictly and through the years. A close reading of the various paragraphs is required to obtain the full meaning of his rather peculiar beliefs.

Aerial Navigation

From his earliest years with Randolph Williams and their nocturnal ramblings together the ideas of a trip to the moon and an "aeronautic car" fascinated Riddell. In Ogdensburg, New York (1831) he contemplated an essay or lecture on the subject, and jotted down some random notes. Included were the following topics:

"Dedalus and the other Ancients who flew. Artificial wings, broom sticks and necromantic jaunts. Montgolfier's confined clouds. Popular accounts of clouds. Inconvenience that it cools copper cylinders. Pyrenious principle of lightness. A man with a phial of it in his pocket. Inflammable air used for balloons . . . Beauty of the scene above the clouds. Some one ought to set Darwin's inflammable air on fire. Proof mathematical that a balloon might ascend ad libitum. The shape of the balloon is wrong. One ought to be made like a fish. Describe one minutely, with the machine. Carry a gass, telescope, compass, barometer, thermometer, food, drink and notebook. Its rapidity. How to keep warm in it . . . Describe an ascent from a hill overhanging a village. Meteorological discoveries – enter thunder clouds – visit to the airy and misty regions where rain, hail and snow is made and those regions prolifick with fireballs, shooting stars, meteors and the aurora borealis. Cross ocean. Explore the course of the Niger. Survey Ethiopia, Siberia and see the wild dangerous animals of the hot desert while cooly seated at an enormous height above them. Explore the dismal precipices of ice around the Himmalah mountains. Explore the south sea, hunt up the frozen remains of antediluvial animals on the farther shores of America. . ."

Personal Journal, vol. 1

"Send an expedition to the moon. A wonder that in the present age of enterprise no expedition should have been projected to the moon which is so near to us. Explain the attraction of gravitation which makes bodies

> tend downward. Another contrivance necessary to go to the moon is to cut off the attraction of gravity or hinder it from acting through coats of any vessel. . ."
>
> *Personal Journal,* vol. 1

Riddell proposed to give his essay the following title:

> "Essay on various philosophical subjects, by the late learned and eccentric philosopher Baron von Kutzko of Astrachan, containing his aerial adventures, voyage to the moon, etc. Faithfully translated from the Russian."
>
> *Personal Journal,* vol. 5

These fancies were eventually put together in a lecture for the People's Lyceum in New Orleans on April 30, 1847, and published under the new title,

> *"Orrin Lindsay's plan for aerial navigation with a narrative of his explorations in the higher regions of the atmosphere, and his wonderful voyage round the moon."*

Orrin Lindsay's space ship was a balloon made out of metal which was unaffected by gravitation. Inside the balloon were all of the instruments mentioned in his 1831 notes. The occupants discussed their oxygen supply, the temperature of the rarefied atmosphere, and the possibility of collisions with meteorites. The lecture was published at the request of a group of prominent New Orleans citizens, including S. J. Peters, M. M. Cohen, Christian Roselius, H. B. Cenas, J.D.B. DeBow, and others, by John C. Noble of Louisville, Kentucky, and also in New Orleans at Rea's Power Press Office. The lecture and pamphlet were reported in DeBow's *Commercial Review* with the comment

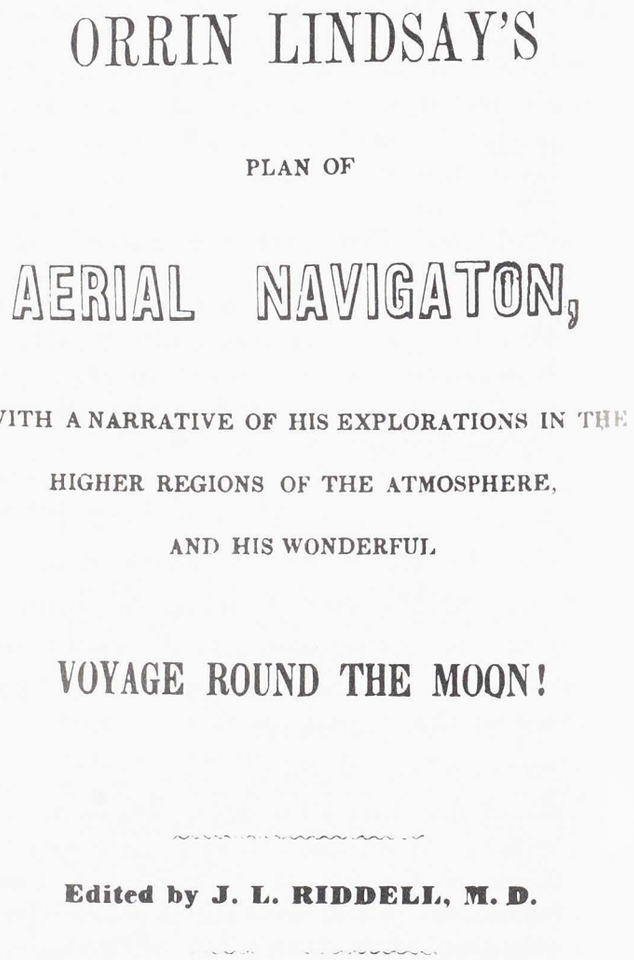
> "Professor Riddell, in a sportive whim . . . made strict science tributary to his fancy."
>
> DeBow's *Commercial Review,* 1847, vol. 3, p. 587

"Orrin Lindsay" is perhaps the cleverest bit of writing Riddell did. He created the character of "Orrin Lindsay" as an Ohio student, but in most of his traits we see the author himself, in his earlier years.

> "Mr. Lindsay, believing with the followers of Newton that gravitation, the grand principle that sustains the planets in the orbits, and gives weight to terrestrial objects, is the result of a direct influence which matter exercises upon matter, near or remote, conceived the possibility of compounding and preparing a substance of such a molecular structure, as to be to this influence impervious. This impervious substance would manifest no weight, for gravity could not act upon it."
>
> *Orrin Lindsay,* 1847, p. 6

Riddell then proceeds to state that in his opinion Mr. Lindsay was in error, that

> ". . . gravitation was not the direct, occult, immaterial principle generally supposed, but the rational effect of material impulses, in some attenuated medium of matter, and that therefore, by no conceivable or possible arrangement of material molecules or impervious screens, could its influence be avoided by,


ORRIN LINDSAY'S

PLAN OF

AERIAL NAVIGATON,

WITH A NARRATIVE OF HIS EXPLORATIONS IN THE

HIGHER REGIONS OF THE ATMOSPHERE,

AND HIS WONDERFUL

VOYAGE ROUND THE MOON!

Edited by J. L. RIDDELL, M. D.

NEW ORLEANS:
Rea's Power Press Office, 58 Magazine street
1847.

Figure 5. Title page of Orrin Lindsay's *Plan of Aerial Navigation* (New York Public Library).

or diverted from terrestrial bodies."

Orrin Lindsay, 1847, pp. 6, 7

He then devotes a page to a quotation from the "Constitution of Matter" on his theory of gravitation.

Lindsay is portrayed as writing Riddell that he has succeeded in preparing a material and has made a voyage into space. Lindsay's account begins

"... I found well prepared steel, after being superficially amalgamated with quicksilver, and then strongly magnetized, to possess the quality of an impervious screen, to the influence of gravitation."

Orrin Lindsay, 1847, p. 12

Lindsay experimented with blocks of the coated metal, and with plates made into a box. Such a box ascended into the air, and could carry weight. He even sent aloft in such a box a small dog. He then continues to describe the construction of the balloon used in the first aerial voyage:

"Its external form was globular, and ten feet in diameter. It consisted of a strong frame of wood work, covered with poplar boards, upon which, externally, were secured plates of the magnetic amalgam. There was one considerable opening, in the manner of a door, into the interior, externally also covered with the amalgam; and twelve circular spy-holes, or windows, symmetrically and equidistantly placed over the whole surface of the sphere, each one six inches in diameter, with twelve plates of the magnetical amalgam to close the openings at pleasure."

"... I entered the balloon alone; not without some misgivings. I seated myself, lighted a wax taper, closed the twelve spy-holes; – the rope was loosened. An indescribable sensation seized me. I could not distinguish up from down. I had lost all bodily weight. The flame of the taper became globular and less luminous; – the heated air from it, seemingly not knowing which was to rise, diffused itself slowly in every direction. The slightest springing effort, sent me slowly from one side of the balloon to the opposite ... and got at an air gage, and observed that the pressure of the air was about half what it is at the surface of the earth, from which I inferred that I had attained an elevation of three miles and a half. I immediately opened several of the windows, until I found in which direction the earth lay. Instantly the force of gravitation took rule again, and the rapid ascent was checked. Bodies acquired weight and the perception of up and down was re-established. . ."

Orrin Lindsay, 1847, pp. 15, 16

The narrative continues in that vein, including some scientific calculations and observations, and also the physiological effects of altitude. It is interesting to compare Riddell's treatment of space travel and space ships with that of our modern space explorations. Many of the same basic ideas are treated by Riddell, in a light, whimsical vein, to be sure. Lindsay's description of the surface of the moon and his view of the earth from the moon are particularly well done.

At intervals prior to the publication of "Orrin Lindsay" Riddell speculated on aerial navigation. He was convinced that this was possible, and in May, 1839, proposed a new balloon made of a thin gilded sheet copper

"with a copper lined room for the aeronaut."

Personal Journal, vol. 18

He revised his design in 1841, tending to a

"long and flat aerial vessel with wings or fins, beak and rudder."

Personal Journal, vol. 19

He predicted that such a machine should

"never have any ascending power, but always a preponderance of weight over levity."

Personal Journal, vol. 19

In June, 1842, he described a peculiar gadget:

"I would depend on wings for locomotion; have always a preponderance of gravitation, which preponderance should lie in a wooden pole say 50 ft long, on the lower end of which could be put at pleasure, a light wheel of 12 ft or so diameter, a delicate model of a vessel to run through water or a smooth metal surface to run on snow or ice."

Personal Journal, vol. 19

Riddell's controversy with R. O. Davidson over Davidson's aerostat has been discussed elsewhere, but this was the start of many calculations on aerial problems, always linking them with gravitation and the theory of freely falling bodies.

None of the lesser speculations are developed in the style and humor of "Orrin Lindsay", and there are evidences in it of the use of some of his earlier material. It is certain that after Riddell seriously considered some of the gadgets – the "aerostats", "aerial cars" etc. – that he recognized the impossibility of their design and abandoned most of his proposed space ships.

The following paragraph appeared in the *Western Medical Reformer and Eclectic Journal,* written by Joseph R. Buchanan:

> "Prof. Riddell. We have received from this gentleman a quizzical pamphlet, purporting to describe a voyage to the moon, being a copy of his lecture before the New Orleans Lyceum. It is ingeniously written, and we suppose may be regarded as a scientific burlesque upon the old theory of gravitation which Dr. R. is endeavoring to demolish, The essay of Prof. Riddell, upon the constitution of matter, in which he purposes a new theory of gravitation, is a profound and ingenious production; one which, in our humble opinion, entitles him to a high rank among the savans of the 19th century. We regret that a copy is not at present within reach. Will Prof. R. do us the favor to send one?" B.
>
> *Western Medical Reformer and Eclectic Journal,* 1847, vol. 1, no. 1, p. 24

Mathematics and Mechanics

Riddell's sole attempt at publication in the field of mathematics was a brief article on logarithms, appearing in the *American Journal of Science and Arts,* 1849. All Riddell did was to write down the general rule for taking roots or raising to powers for ordinary logarithms, using some of his symbolic language. There is nothing original in the paper.

Another speculation was based on his idea that "there is no possible formula in algebra that cannot be expressed in space."

> ". . . in regard to the projection or modelling of the powers in space there are but three species of forms, namely, primarily, the point, the line and the surface; secondarily, the finite cube, the parallelopipedon and the parallelopipedon squared, etc. repeating the analogues of the point, the line and the square. In relation to space there is a remarkable series of seven terms, in geometrical progression, the ratio of which is infinite, which may be expressed
>
> $$0 : 0\infty : 0\infty^2 : 0\infty^3 : 0\infty^4 : 0\infty^5 : 0\infty^6$$
>
> In this symbolism 0 = zero; ∞, infinity; 0., a point; 0∞, a finite line; $0\infty^2$, a finite square surface; $0\infty^3$, a finite cube of space, the analogue of the point; $0\infty^4$, a parallelopipedon of infinite length, the analogue of the line; $0\infty^5$, the same square, the analogue of the surface, $0\infty^6$, an infinite cubic space, the analogue of the point."
>
> New Orleans Academy of Sciences, *Minutes.*

Riddell's ideas of natural philosophy (physics) were obtained solely from reading and from his own experiments. He had no formal training in the subject so far as we are able to determine. Some of the fundamental ideas of mechanics intrigued him, and brought forth some extraordinary hypotheses. During his stay in Pittsburgh he recorded his talks with Dr. Bruce, president of the Western University of Pennsylvania, about

> "the ratio in which air or other fluids would impede a body moving with different degrees of velocity."
>
> *Personal Journal,* vol. 4

Bruce maintained that

> "the obstruction of air was directly as the square of the velocity,"
>
> *Personal Journal,* vol. 4

but Riddell remarked

> "now though that is undoubtedly incorrect I will make some calculations thereupon."
>
> *Personal Journal,* vol. 4

And then he proceeded to calculate for four pages, deriving a complex formula for the velocity of particles moving through a resisting medium in terms of the diameter of the particle.

Later he changed his opinion and accepted the proportionality Bruce stated, for in some of his aerial calculations he lists the following assumptions:

1. "Resistance of medium proportional to v^2 of moving body.
2. "A cylinder moving endwise through a resisting fluid encounters four times the resistance of a sphere of the same diameter and moving with the same velocity;
3. "A spherical drop of rain of 1/10 inch in diameter would have, in falling through air, a terminal velocity of 10.48 ft/sec."

Personal Journal, not numbered

Riddell's master philosophy of the source of motion is peculiarly stated:

> "I conceive radiation from the sun to be the remote source of all terrestrial motion, as winds, currents of matter, and the motion of organic life; and I conceive radiation from the earth to be the grand outlet of the momentum which manifests itself in the earth's surface. . ."
>
> *Personal Journal,* vol. 18

He always spoke and wrote in terms of momentum rather than force. His concepts

of momentum and collision theory are those we use today. In his words, when a solid moves through a fluid, there is a change of momentum.

> "Here momentum is transferred from a ponderable solid to a ponderable fluid."
>
> *Personal Journal,* vol. 18

Related to this idea is his concept of friction:

> "Friction, then, is the expression of the transference of momentum, from ponderable to imponderable matter. The converse of this transference occurs, i.e. the transference of momentum from imponderable to ponderable matter, as in the steam engine, the electro-magnetic engine, the motion of living systems. . ."
>
> *Personal Journal,* vol. 18

> "It is well known that friction is attended with an elevation of temperature and what is sensible caloric but ethereal matter in motion."
>
> *Personal Journal,* vol. 18

Riddell did not agree with Newton's theory of gravitation, and proposed his own theory of the radiant cause of gravitation. He believed that gravitation

> "is caused by the radiations of ethereal particles in all directions, having the power to impart their momentum to ponderable matter. Particles of the subtile matter are flying with immense velocity in all directions through space. A cannon ball or other object in the air has a tendency to approach the earth because it receives the impulses of those moving particles from all directions except toward the earth, where the momentum of those due from that direction has already been intercepted."
>
> *Personal Journal,* vol. 15

He claimed that he was able to reconcile his theory of the radiant cause of gravitation with Newton's inverse square law, since

> "the influence of all radiation in right lines decreases inversely as the square of the distance from the radiant source."
>
> *Personal Journal,* vol. 18

In the words of Dr. Albert Welles Ely, Riddell's substitute for Newtonian gravitation is the impulsive doctrine:

> ". . . that all the vast empyrean of nature is filled with a species of extremely subtile matter, or ether, as Euler calls it, or giving it its new name used by Professor Riddell, ponderefacient matter, by virtue of which all bodies have weight . . . Next it is supposed that this medium in which all the celestial bodies are suspended is traversed by right-lined impulses of motion in every direction and of course acting on everything contained in it."
>
> *New Orleans Medical and Surgical Journal,* 1846, vol. 3, p. 3

> "A body then upon which these impulses of motion act in every direction without obstruction will be perfectly at rest; but if another body intercepts the impulses of motion, in any direction, the two bodies will immediately begin to approach one another . . . a body for example approaches the earth or sun because the impulses of motion are interrupted in the direction of the earth or sun by those bodies, and thus the opposite impulses are left to act alone upon the body."
>
> *New Orleans Medical and Surgical Journal,* 1846, vol. 3, p. 3

Riddell firmly believed that

> "this subtile ether may thus be the cause of gravitation."
>
> *Personal Journal,* vol. 18

The nature of this ether was set forth as follows:

> "Is not the interstellar medium of luminiferous ether necessarily a resisting medium? I infer it must be so after this wise: it transmits luminous and other effects of a material nature, and therefore it must be material. Being matter its particles are capable of motion, and would in moving possess momentum; we see that mechanical and chemical action set light in motion, in which case the luminiferous either derives momentum from common matter. (The converse therefore must be true, that the momentum of the luminiferous ether can be imparted to common matter). A planet moving through space thus occupied must communicate momentum to the luminiferous ether, and thus in the same degree be robbed of momentum itself. These effects are manifested in the retarded motion of the planets in any assigned time, though of enormous duration may be inappreciably small, and hence may ever to us elude direct observation.Yet I am under the impression that the inference of resistance must be admitted."
>
> *Personal Journal,* not numbered

Riddell was never completely clear in his writing exactly what he meant by gravitation. In some cases he refers to the "velocity of gravitation" as the "velocity of waves or impulses in a medium" and in others refers to gravity as proportional to the cube of the

diameter of a falling particle. He set up his own symbolic relationship for the size of particles, which he used on many occasions:

m = a sensible portion of common matter
θ = a fraction of unity, indefinitely small
$m\theta$ = an expression for the weight of a particle of common matter
$m\theta^2$ = an expression for the weight of a particle of luminiferous ether
$m\theta^3$ = an expression for the weight of a particle of gravitation-bearing ether.

Personal Journal, not numbered

A curious bit of speculation was his term "mass of motion" defined as

> "the product of the weight of a moving body and the space moved through."
>
> *Personal Journal,* vol. 19

Riddell illustrated the term by the following example:

> "If 100 pounds of lead move one rod, the mass of motion is 10."
>
> *Personal Journal,* vol. 19

Riddell used this idea to demonstrate the fallacy of plans for perpetual motion. Later he admitted that the term was incorrect, that he was confusing momentum with "mass of motion."

In connection with the Davidson aerial navigation controversy he devised a convenient method to calculate the force necessarily exerted in flight to sustain a bird from falling, provided the weight of the bird (in pounds) and the area of its wings are given. His calculation is as follows:

> "Multiply weight in pounds by 71.08, divide by the area of wings in square feet. Take square root. Multiply the root by the weight of the bird in pounds, then by 0.152. This will be the number of pounds raised 1 ft/sec expressive of the force exerted."
>
> *Personal Journal,* not numbered

As early as November 15, 1835, Riddell expressed his ideas on attraction and repulsion.

> "I will note down some of my crude incipient opinions on the subject of attraction and repulsion. Let me suppose that repulsion is caused by ethereal matter as caloric; that the amount of repulsive force is in direct proportion to the quantity of ethereal matter among ponderable particles. Let the body to be contemplated be a gallon of air in a glass bottle. Now if this air be so compressed that the distance from one aerial particle to its neighbour be reduced ½ (½x½x½ = 1/8) the air would be contained in a pint measure, there would be only 1/8 the previous volume and supposing no ethereal matter to be lost it will be eight times as dense as in the commencement, therefore the repulsion will be eight times as strong. This accords with fact."
>
> *Personal Journal,* vol. 14

There were occasions when Riddell attempted to refute a body's attraction for another. His original radiant theory of gravitation could be interpreted to show that the sun would repel the earth, but he modified his thinking to take care of this situation.

In another statement on falling bodies:

> "Bodies falling in the air acquire a certain maximum of velocity, which depends upon their size and density. The resistance they meet with is in proportion to the square of their diameter. (I suppose them globular). The forces of gravity, in proportion to the cubes of their diameters. They acquire their maximum of velocity when the resistance equals the gravity."
>
> *Repository,* vol. 6

Riddell's views on capillarity were not as sound as some of his other theories. He recognized the correct formulation of the law of capillary rise, but when he applied capillarity to living systems he was not correct. His statement of the basic law is:

> ". . . multiply the diameter of a known tube by the height at which the liquid stands, and divide the product by the height of the required tube. This will afford a very accurate mode of measuring the capacity of capillary tubes of glass."
>
> *Personal Journal,* vol. 4

On another occasion he wrote:

> "The sun, I have no doubt, as well as the moon, must have some influence on the absolute weight of bodies on the earth's surface."
>
> *Personal Journal,* vol. 12

He then estimated the influence that the sun exerts on a corpuscle of matter on the earth's surface, and constructed a "gravimeter" to study capillary action.

XIV. NEW ORLEANS – 1846-1850

Riddell's introductory lecture at the University of Louisiana in 1846 was published as a "Brief sketch of subjects embraced in the science of botany, with its relation to medicine, and some of the inducements for

engaging in its study." This article was frequently referred to as "Medical Botany." The Professor told his students

> "that he had taken some pains to determine the number of species indigenous to Louisiana and that including all yet observed by Darby, Robin, Bartram, Teinturier, Drummond, Dr. Hale, Professor Carpenter and himself, he had listed about 1000 different species."
>
> *New Orleans Medical and Surgical Journal,* 1846, vol. 2, pp. 445-449

He urged them to form their own herbaria:

> "Collect . . . specimens in flower of the different wild herbs you meet with, and dry them by pressing them between many thicknesses of brown paper, or old newspapers. Arrange these specimens in a book or otherwise, and if you are not skillful enough to affix the right names to accompanying labels, get some competent botanist to name them for you.
>
> *New Orleans Medical and Surgical Journal,* 1846, vol. 2, pp. 445-449

This is reminiscent of Riddell's earlier years when, in anticipation of a private medical practice, he had collected and dried various herbs and the roots of medicinal plants.

Riddell's marriage to Angelica Eugenia Brown was solemnized December 1, 1846. The marriage contract was passed before Daniel J. Ricord, notary, on November 13, 1846. The couple had eight children:

Lephe Eugenia	– born April 3, 1848
Mary Angelica	– born February 14, 1850
Susan Adelaide	– born October 29, 1851
Gaen Leonard	– born November 25, 1853
Robert Brown	– born December 8, 1853
Peter Gates	– born January 13, 1858
Jefferson Davis	– born October 29, 1861
Hugh Gawn	– born June 18, 1865

It is not pertinent to this work to trace the lives of each of the children. A few random observations must suffice. Gaen Leonard died in New Orleans, February 12, 1858. Lephe Eugenia married York A. Woodward of New Orleans, and died September 25, 1902. Mary Angelica married Robert F. Hogsett of New Orleans, and died December 1, 1870. Peter Gates married Louise Jehle, and died about 1912. The exact dates of death and marriages of the remaining children have not been located.

After the birth of his daughter Lephe in 1848 Riddell purchased a home in Carrollton, Louisiana, now a part of New Orleans, moving there from the Mint. He left his brother George, who had received his Doctor of Medicine degree from the University of Louisiana.

> "to perform my duties as melter and refiner in the Mint."
>
> *Personal Journal,* not numbered

He lived in Carrollton only a few months, but returned there in March, 1849.

> "In December, 1848 I was removed from office in the Mint, through some Creole manouevers, alleging that I neglected my duties and incompatibly held a state office (Professor in the University of Louisiana). I never could get at any other charge. I settled up my accounts fair and square at the end of the year (1848) and retired from the Mint. My brother and his wife returned to the North, Oxford, Chenango Co., N.Y."
>
> *Personal Journal,* not numbered

In a letter to Dr. George Engelmann, March 31, 1849, Riddell wrote:

> "Having no longer any office in the Mint, which for years has absorbed so much of my time, I propose again to devote some attention to botany. I will endeavor sooner or later to requite some favors I have received at your hands. But I beg you will for the present allow me to become still deeper in your debt. I am desirous of getting your published memoirs on the plants of Texas, especially those collected by Lindheimer. If you cannot send me copies by mail, pray inform me what volume of what transactions to send for, as containing them.
>
> "I must have on hand many duplicates of Southern plants, some of which may be acceptable to you, at least as material for further exchanges. If you say so, when I overhaul them, I will lay you aside a parcel.
>
> "Any of your own memoirs on botany will be to me acceptable. . ."
>
> Engelmann letters, Missouri Botanical Garden, St. Louis, Missouri
>
> March 31, 1849

XV. NEW ORLEANS – 1850-1860

With additional time to devote to his scientific activities Riddell entered a new phase of his work. From 1850-1855 he did some of his best scientific work, principally the invention of the binocular microscope. Despite the unfortunate publicity which accompanied most of his controversies at the Branch Mint, and his scientific exchanges, he

was much in demand as a lecturer and as a writer.

Riddell was a charter member of the American Association for the Advancement of Science (1848) and attended the Cleveland meeting (1853) as a representative of the New Orleans Academy of Sciences. He presented four papers on that occasion.

He was also a charter member of the original Louisiana State Medical Society (1849) and was chairman of its committee "on the indigenous botany of the state and its materia medica." Riddell continued his teaching in the Medical Department of the University of Louisiana, with the new title "Professor of Chemistry and Materia Medica."

Not too many details about Riddell's academic life have been recorded. It is known that he was not very well liked by his associates on the medical faculty. This follows logically from his temperament and his sarcastic and often bitter attacks on individuals. On one occasion he antagonized his fellow faculty members so much that he was relieved of his position, but he declined to resign. He was reinstated, after lengthy reconsideration, some time later. On another occasion when he was ill he allowed his brother William Pitt Riddell to lecture in his place. William, then a student in the Medical Department of the University, was a graduate in chemistry from Yale University. Unfortunately he was heard lecturing by the Dean of the Medical Department. The Dean became quite excited, and reprimanded John Leonard. But at a subsequent faculty meeting he defended his brother William staunchly. William became a member of the faculty of the Collegiate Department of the University of Louisiana at a later date.

During the early fifties Professor Riddell was engaged in the development of his binocular microscope, probably his most outstanding contribution to science. The instrument was described in a talk before the Physico-Medical Society of New Orleans on October 2, 1852, and was reported at the Cleveland, Ohio, meeting of the American Association for the Advancement of Science in 1853. This development followed several years of microscopic work for which Riddell used a Spencer instrument.

During the summer of 1853, Dr. Riddell and his son Sanford traveled by boat to New York, by way of Havana, Cuba. Sanford spent a good portion of each year in New York State with his grandmother and other relatives.

Later in 1853, Riddell and his brother William made several inspection trips for the Sanitary Commission of New Orleans. The Sanitary Commission, composed of A. D. Crossman, Mayor of New Orleans; Dr. Edward Hall Barton, chairman; Dr. A. F. Axson, Dr. J. C. Simonds, Dr. S. D. McNeil and Dr. John Leonard Riddell, was authorized to report on the causes and prevention of yellow fever, as well as the extent of the 1853 epidemic. The Riddell brothers journeyed to Lake Providence, Louisiana, and to Vicksburg, Mississippi, to survey conditions in these regions. A formal report of the Commission, largely written by Dr. Barton, was prepared and published in 1854. Riddell did not agree with all of the opinions expressed in the report, and so stated publicly in lectures and articles.

The relationship between William and John Leonard serves to illustrate another facet of Professor Riddell's personality. His strong love for his family, as noted during the days of his wanderings, increased as he became an established professor and scientist. As was noted in another section, two of his brothers were employed, at least for a brief time, at the Branch Mint. John Leonard had sent William money for his education on many occasions, so that it was natural for William to come to New Orleans after his graduation from Yale University. William always held John Leonard in the highest regard, and their relationship was always on a friendly basis. The brothers maintained a commercial laboratory of analytical chemistry, and advertised in the local newspapers and journals. On the front cover of the *New Orleans Monthly Medical Register* for April, 1853, we find the following:

> "Chemical Analyses and Chemico-Microscopic Examinations of Waters, Ores, Natural, Morbid and Manufactured Products.
>
> "Assay of Ore $10
> Assay of gold or silver bullion $5
> Assay of Soil $25-50

White Sugar or Cane Juice $5
Molasses or Brown Sugar $7½
Mineral Water (qual) $10-25
Mineral Water (quant) $50-100
Urine (Microscopic and Chemical) $5

Many analyses were published, notably those of mineral springs, "wheat flower" and soda water.

The selection of William Pitt Riddell as a member of the faculty of Jefferson College, St. James Parish, Louisiana, and later as a member of the faculty of the University of Louisiana was influenced, no doubt, by John Leonard's prestige in the community. William, however, was a very capable chemist in his own right. He noted in his diary that he thought his brother (John Leonard) would be appointed president of the University of Louisiana (1855) but this did not materialize.

William prepared the genealogy of the Riddell Family, referred to earlier, which was brought to New York for publication by his brother. The manuscript was placed in the hands of John F. Trow, said to be the best printer in New York City (1852).

John Leonard sent sons Sanford and Edward Henry to Jefferson College in care of brother William (1853) and visited them on several occasions.

One of the few illustrations of the kindly, paternal side of Riddell is given in the following letter to his son Edward Henry:

Univ. La., New Orleans, Oct. 14, 1853

"Dear Son,

I was glad to receive your letter dated Oct. 2. You seem to be doing well. I am sorry you do not spell better. In order to become a good speller you must get into the habit of reading books which interest you; and you must inquire of Sanford, the meaning of words, or look them out in a dictionary. Your letter, however, looks remarkably well and business like, and I am proud to receive it. I have great confidence that both you and Sanford will do well.

"Keep yourselves clean, tidy, dry and warm. Keep your hair and teeth clean. Wash your teeth well with a brush at least once a day, say in the morning when you first get [up]. Do no mean action. We are all well here.

From your father,
J. L. Riddell

To Edward H. Riddell

This letter was part of the Frederic J. Grant collection of Riddell philatelic materials, and was sold at auction in 1959. The purchasers, Raymond and Roger Weill of New Orleans, kindly permitted the author to copy the letter.

Professor Riddell gave at least two public lectures at the Mechanics Institute each year. Not all of these were based on new material, for one of his old favorites, "On the chemistry of the atmosphere" was programmed March 2, 1854. On one occasion the local press commented:

> "The interest naturally attending the subject was heightened by the lucid and almost brilliant illustrations of the learned Professor and his manner of presenting it added laurels to his previously well-earned fame."

This extract, undated and with subject unknown, is found in brother William's diary.

Riddell, the business man, expanded his interests in 1854, purchasing some property near Amite, Louisiana and some near Chatawa, Mississippi. The Chatawa property served as a vacation home for the Riddells and their families and friends for many years. William wrote that the

> "... distance from Brother John's place to the state line is five miles."
>
> W. P. Riddell, *Diary*

Riddell prepared a technical report in 1854 on the subject of city sewerage for the Sanitary Commission, and presented it to the municipal authorities. He gave a detailed plan for the improvement of the sewerage system, including scale drawings, locations of major pipes, joints, etc.

Dr. Riddell was one of the founding members of the New Orleans Academy of Sciences in 1853. He was not one of the original group who established the society, but, by vote of the original members, on May 9, 1853, he was elected to the Academy and included as a Charter Fellow along with eight other scientists of the city. He duly subscribed to the Constitution of the Academy on May 10, 1853. It is curious to note that his brother William was a Fellow of the Academy before his more distinguished elder brother. As would be expected, Dr. John Leonard Riddell took a very active part in

the new society. One of its early meetings, May 23, 1853, was held in his home. He was appointed, along with Dr. Edward Hall Barton and Caleb G. Forshey, to represent the Academy at the 1853 meeting of the American Association for the Advancement of Science. He was also a member of the Academy Committee on Publications and presented copies of his "Monograph of the Silver Dollar" and "Report on the Epidemic of 1853" to the Academy on March 6, 1854. He demonstrated his binocular microscope before the Academy on March 27, 1854.

Most of Riddell's activities in the New Orleans Academy of Sciences were of a scientific nature, with full participation in all discussions on all topics. He demonstrated his paraboloid objective, refuted Dr. Edward Hall Barton's theory of the cause of epidemics, ridiculed Dr. Isaac Crawcour's papers on chemistry, and urged the Academy to participate in balloon ascensions. On one occasion (February 19, 1855) Riddell commented on a paper by Dr. William B. Lindsay as follows:

> "Having himself been accustomed in early life to the labors of the farm, he was practically familiar with the cultivation of cereal crops, as practiced in the cold States of the North, where the industry of six or seven months of the warmer season is demanded to provide sustenance for the remainder of the year; but he had no experimental knowledge of the raising of vegetables, etc. in this mild climate. Any person experienced in housekeeping in New Orleans can testify to its extraordinary expensiveness. When the common potato is sold, as it is now, at the rate of two for five cents, he thought it high time for us to endeavor to devise some cheaper means of obtaining that very essential article of vegetable diet."
>
> New Orleans Academy of Sciences, *Minutes,* February 19, 1855

From the remarks noted by the excellent secretary of the Academy, Dr. Noah B. Benedict, Riddell's phraseology on many occasions was sarcastically polite, nothing more, and it is small wonder that he was not popular among his colleagues. He was indeed a man of strong convictions, and anyone disagreeing with him would feel his verbal sting.

Riddell was elected vice-president of the New Orleans Academy of Sciences in 1854, and president in 1855. He was re-elected annually and was still serving as president at the time of his death in 1865. From some of the discussions in the Academy minutes we wonder whether Riddell's popularity in that organization might be due to the fact that those who opposed him either died or left New Orleans during the early years of the Society, and, since there was a blackball system for new members, only those who were friendly to Riddell constituted the Society.

It was the policy of the Academy to have the president read an Annual Address at a public gathering in February of each year. These occasions gave Riddell an opportunity to demonstrate his extraordinary abilities as a lecturer, and we find several of these speeches printed in pamphlet form, and also carried by the local press. For, example, the February 25, 1856, lecture appeared in the New Orleans *Sunday Delta,* and also as a pamphlet. It is a remarkably good resume of scientific activities of the year 1855-1856, citing developments in astronomy, geography, metallurgy, chemistry, physics, botany and geology, with remarks about the circulation of blood and the atmosphere.

In 1855, Riddell was appointed a member of a new Committee to devise protection for New Orleans from flood waters of the Mississippi River. This followed a series of severe crevasses which had threatened the city for several years. Others serving with him were W. S. Campbell, A. D. Crossman, H. J. Ranney, and J. C. Clarke.

Dr. Riddell was seated in a third floor room of his home at #328 Camp Street, when a lightning flash struck the building during a thunderstorm (1857). His dog, which was on the floor between his feet, was killed by the bolt. Riddell described the experience as a

> "sudden intense glare of light, and fragments of wood, bricks and plaster flying in all directions. Heard no sound whatever. Was conscious of no clap, noise or concussion of any kind, but felt as if he had received a great blow on the top of his head."
>
> New Orleans Academy of Sciences, *Minutes,* January 5, 1857

One of Riddell's pet projects, the Geological Survey of the State of Louisiana, was revived by the New Orleans Academy of Sciences in 1855. He was, naturally, a member of the Committee memorializing the Legislature of the State of Louisiana. The project did not meet with as much enthusiasm and approval in the Legislature as was hoped and actually the complete survey was never made. A partial survey appeared after Riddell's death.

Because of his geological interests, Riddell was one of the prime movers in an attempt to drill an artesian well in the center of Canal Street, main business thoroughfare in New Orleans. This project, sponsored by the New Orleans Academy of Sciences, was undertaken in 1855, following Riddell's recommendation that the well would produce "potable mineral water." The attempt was a dismal failure, although Riddell contended that the project was never carried to completion, but abandoned. This was actually correct for the appropriation was exhausted and additional funds were not forthcoming.

XVI. SCIENTIFIC ACHIEVEMENTS – 1850-1855

This was the most productive period of Riddell's life. A brief summary of some of his more important investigations is given here.

The Binocular Microscope

In the field of optics, Riddell's outstanding contribution was his binocular microscope. His interest in microscopy began with his first purchase of a Spencer instrument in 1850.

> "... it is now fairly conceded that Spencer, though an American, has considerably excelled the best English and European opticians in this most difficult department of practical optics.
>
> "... observations were made with a glass of exquisite workmanship, one of Spencer's latest and best productions. I gave him an order for the finest objective of high power which he could make, expressly without limit as to price. He sent me the instrument ... in May, 1852 writing me at the same time that it was the best he had ever made, and charging me for it, what I consider a most moderate sum, $120; for its defining power is so great and so wonderfully accurate, that a sum of money greater than I choose to name, would not deprive me of its possession. It is rated by Spencer as 1/16 of an inch focus, though the available working focal distance is probably less than 1/200 of an inch, requiring the very thinnest of Chance's thin glass, for covering objects to be seen. Its angle of aperture is full 174°! a figure at least 40 units beyond what the best Eurpoean opticians have, until quite lately, considered practicable ... That most difficult test object, the *Grammatophora sublitissima* of Bailey, is, by this glass, readily and clearly resolved into black, beaded lines."
>
> *New Orleans Medical and Surgical Journal,* 1852, vol. 9, p. 119

There followed a series of thorough microscopic investigations, with several papers published between 1850 and 1854.

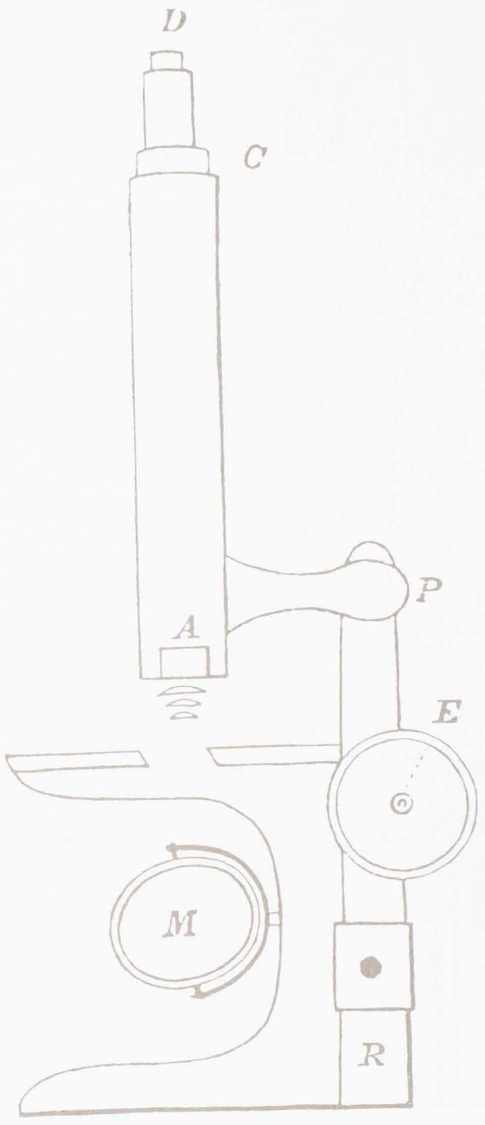


Figure 6. Side view of Riddell's binocular microscope (from *Proceedings, American Association for the Advancement of Science,* 1853, vol. 7, p. 20).

The binocular microscope was designed in 1851, constructed and tested during 1852, and formally reported to the New Orleans Physico-Medical Society on October 2, 1852. In principle, it divided light from a single objective by means of a combination of four glass prisms, passing the light beams to the eyes through two parallel tubes, each having its own ocular. The account of the meeting of the Physico-Medical Society was reported in the *New Orleans Monthly Medical Register* for October, 1852, and was probably written by Riddell. The basic principle is stated:

> "Behind the objective, and as near thereto as practicable, the light is equally divided, and bent at right angles, and made to travel in opposite directions, by means of two rectangular prisms which are in contact by their edges, that are somewhat ground away. The reflected rays are received at a proper distance for binocular vision upon two other rectangular prisms, and again bent at right angles; being thus either completely inverted, for an inverted microscope, or restored to their original direction. These outer prisms may be cemented to the inner, by means of Canada balsam; or left free to admit of adjustment to suit different observers. Prisms of other form, with due arrangement, may be substituted.
>
> *New Orleans Monthly Medical Register,* 1852, vol. 2, p. 4

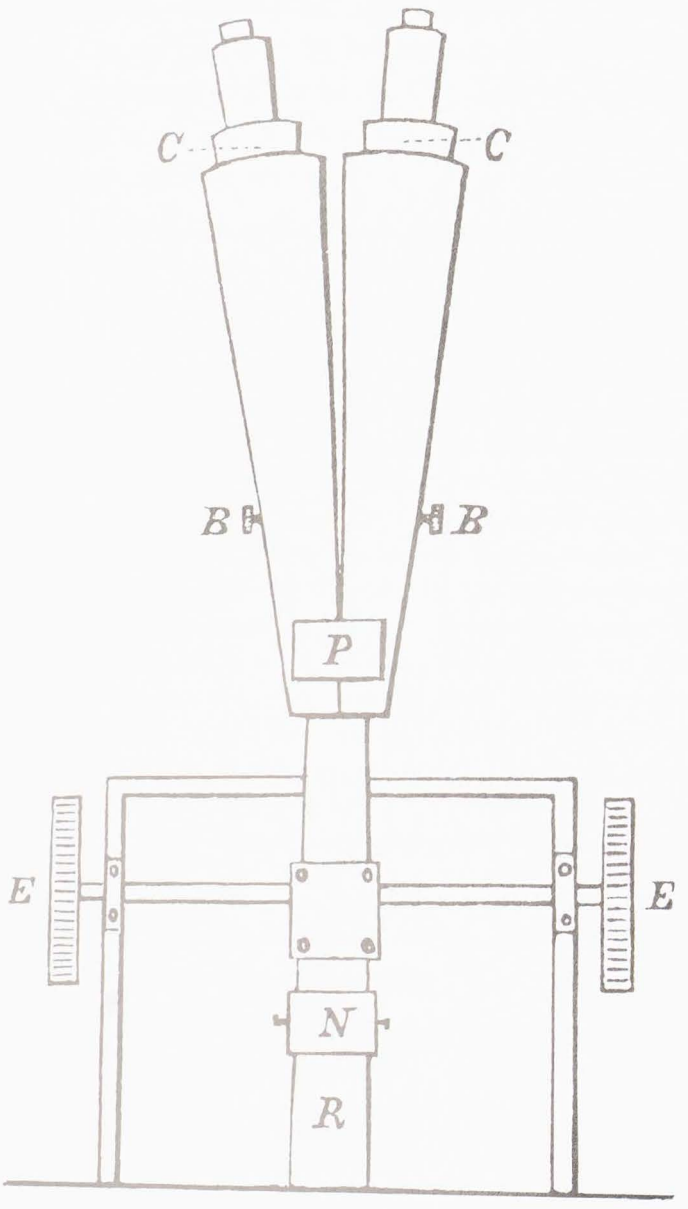


Figure 7. Back view of Riddell's binocular microscope (from *Proceedings, American Association for the Advancement of Science,* 1853, vol. 7, p. 20).

The original instrument was described before the Cleveland meeting of the American Association for the Advancement of Science on July 30, 1853. In Riddell's own words, and referring to this diagram,

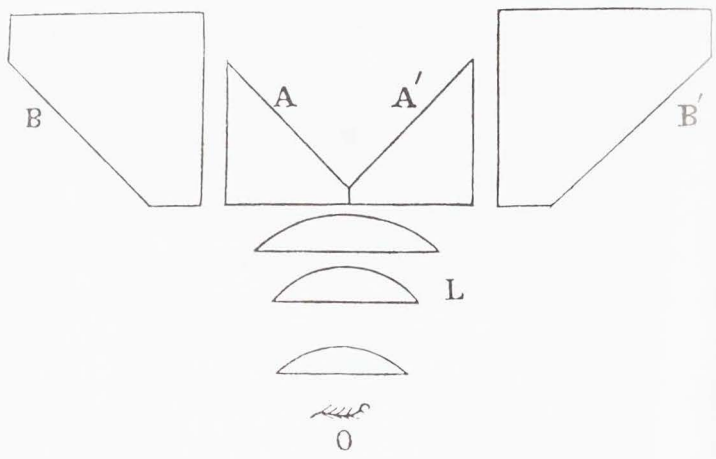


Figure 8. Diagram of Riddell's binocular microscope (from *Proceedings, American Association for the Advancement of Sciences,* 1853, vol. 7, p. 16).

> "O represents object to be seen.
> L the objective combination; always brought as near as practicable to the prisms.
> A,A' two isosceles rectangular prisms of fine glass, in contact by the edges, which are somewhat ground away.
>
> "The light entering the prism A through the objective, suffers internal reflection on the hypothenuse A, and emerges from the prism in the direction of B. Entering the prism B it is restored to its original direction. So likewise that part of the luminous pencil entering the prism A' emerges nearly parallel from the prism B'. The prisms B and B' are adjustable to different distances apart, and have likewise an axial adjustment in the plane of the section represented; the first, that they may be made to correspond to the interval between the two eyes of the observer; the second, that the direction of the rays travelling from each point of the object through these prisms, may be such as will seem to the observer natural

and unconstrained and give clear, coincident fields."

Proceedings, American Association for the Advancement of Science, 1853, vol. 7, p. 17

This instrument could be used with or without oculars or erecting eye-pieces, and with all grades of good lenses. Riddell stressed that a true stereoscopic effect was always obtained.

> "It gives the observer perfectly correct views in length, breadth and depth, whatever power he may employ; objects are seen holding their true relative positions, and wearing their real shapes. . ."
>
> *New Orleans Monthly Medical Register,* 1852, vol. 2, p. 4

He did admit, however, that

> "In looking at solid bodies, however, depressions sometimes appear as elevations, and vice versa, forming a curious illusion. . ."
>
> *New Orleans Monthly Medical Register,* 1852, vol. 2, p. 4

The original instrument was quickly modified to eliminate the pseudoscopic effect. This was reported to the New Orleans Physico-Medical Society, April 2, 1853.

> "Professor Riddell, the original inventor of the binocular microscope, exhibited and explained a simplification of that important instrument by which, at an expense not necessarily exceeding thirty or forty dollars, it is practicable, in existing compound microscopes of the ordinary forms, to replace the brass tube carrying the ocular and objective, by an efficient arrangement for binocular vision."
>
> *New Orleans Monthly Medical Register,* 1853, vol. 2, p. 78

Only two forty-five degree French prisms were used in the modified instrument:

> "They must be of such form, that the faces, at which the light is immergent and emergent, shall form equal angles with the face on which the internal reflection occurs. The chromatic dispersion is a minimum, and really nothing, when these angles are each near eighty-seven degrees . . . To produce orthoscopic binocular vision, simple, not erecting eye-pieces are required."
>
> *New Orleans Monthly Medical Register,* 1853, vol. 2, p. 78

The modification was also reported to the *Quarterly Journal of Microscopical Science* and to the American Association for the Advancement of Science.

In his paper at the 1853 meeting of the American Association for the Advancement of Science Riddell noted that the instrument could be used as a dissecting microscope, if the focal length of the objective lens was ½-3 inches, and no eyepiece used.

> "The image is erect and orthoscopic . . . If over B and B' (see previous diagram) single oculars be placed, the binocular vision is found to be pseudoscopic; that is, depressions appear as elevations, and elevations as depressions. With erecting or double eyepieces, analogous to the terrestrial telescope, the vision again becomes orthoscopic."
>
> *Proceedings, American Association for the Advancement of Science,* 1853, vol. 7, p. 17

Riddell's design of a compound binocular microscope is also given in his 1853 paper. Using the sketch from that paper

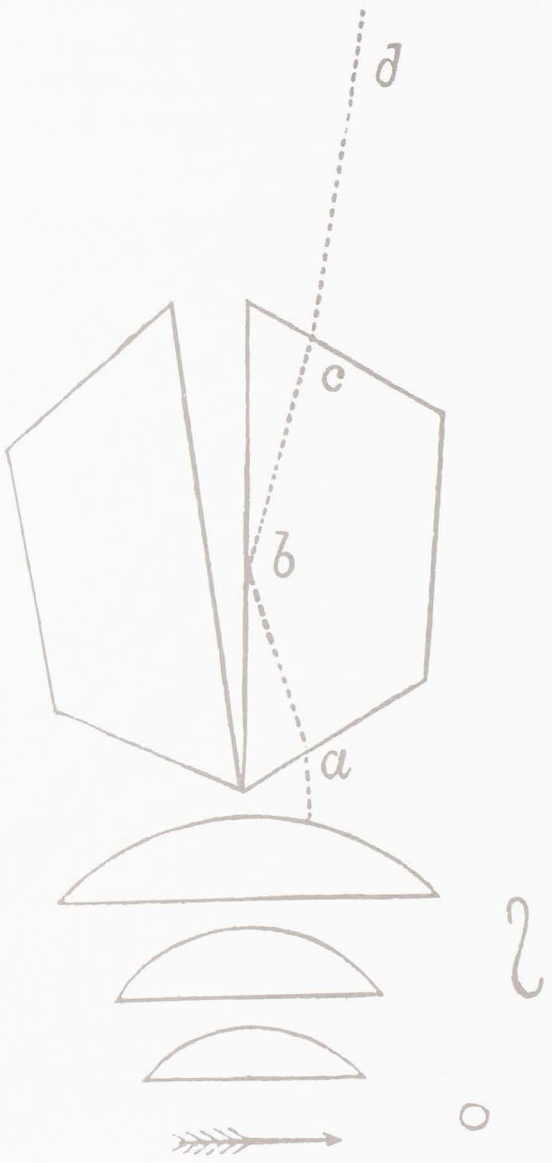


Figure 9. Arrangement of prisms above the objective in Riddell's binocular microscope (from *Proceedings, American Association for the Advancement of Science,* 1853, vol. 7, p. 18).

> "The light through the objective, which impinges upon a is, that part of it which enters the prism refracted to the left, so that it meets with the reflecting surface b. Suffering total reflection, it emerges from the surface c, where, from the necessary identity of the immergent and emergent angles, it is refracted to the left**, so as to exactly compensate for its previous refraction to the left. This implies that the upper and lower angles of the prism are equal."
>
> *Proceedings, American Association for the Advancement of Science,* 1853, vol. 7, pp. 18-19

An instrument of this design, constructed for Riddell by the Grunow Brothers of New Haven, Connecticut in 1854, was presented to the United States Army Medical Museum, Washington, D.C. in April, 1879, by Mrs. Angelica Riddell. In this model, which is upright, the two tubes are adjustable at either end,

> "so that their inclination to each other may be varied; and the whole arrangement slides at pleasure, horizontally, in order to adapt the distance to the eyes of different observers."
>
> *Proceedings, American Association for the Advancement of Science,* 1853, vol. 7, pp. 20-21

The angle of the prisms is also adjustable. With this instrument

> ". . . microscopic objects . . . seemingly hung in mid-air, stand out in all the boldness and perfection of relief and with definiteness of position in width and depth, which he has been accustomed to realize without glasses, in the natural objects around him."
>
> "Opaque objects may be illuminated by the bull's eye condenser; and transparent objects by two concave mirrors, aided by two diaphragms . . . or one large concave mirror and two screws. At night, two candles may be used conveniently with one mirror. To illuminate for the higher powers, a single achromatic condenser suffices."
>
> *Proceedings, American Association for the Advancement of Science* 1853, vol. 7, pp. 21-22

**The word "left" is incorrect, and should be "right". A similar article in the *New Orleans Medical and Surgical Journal* has "right".

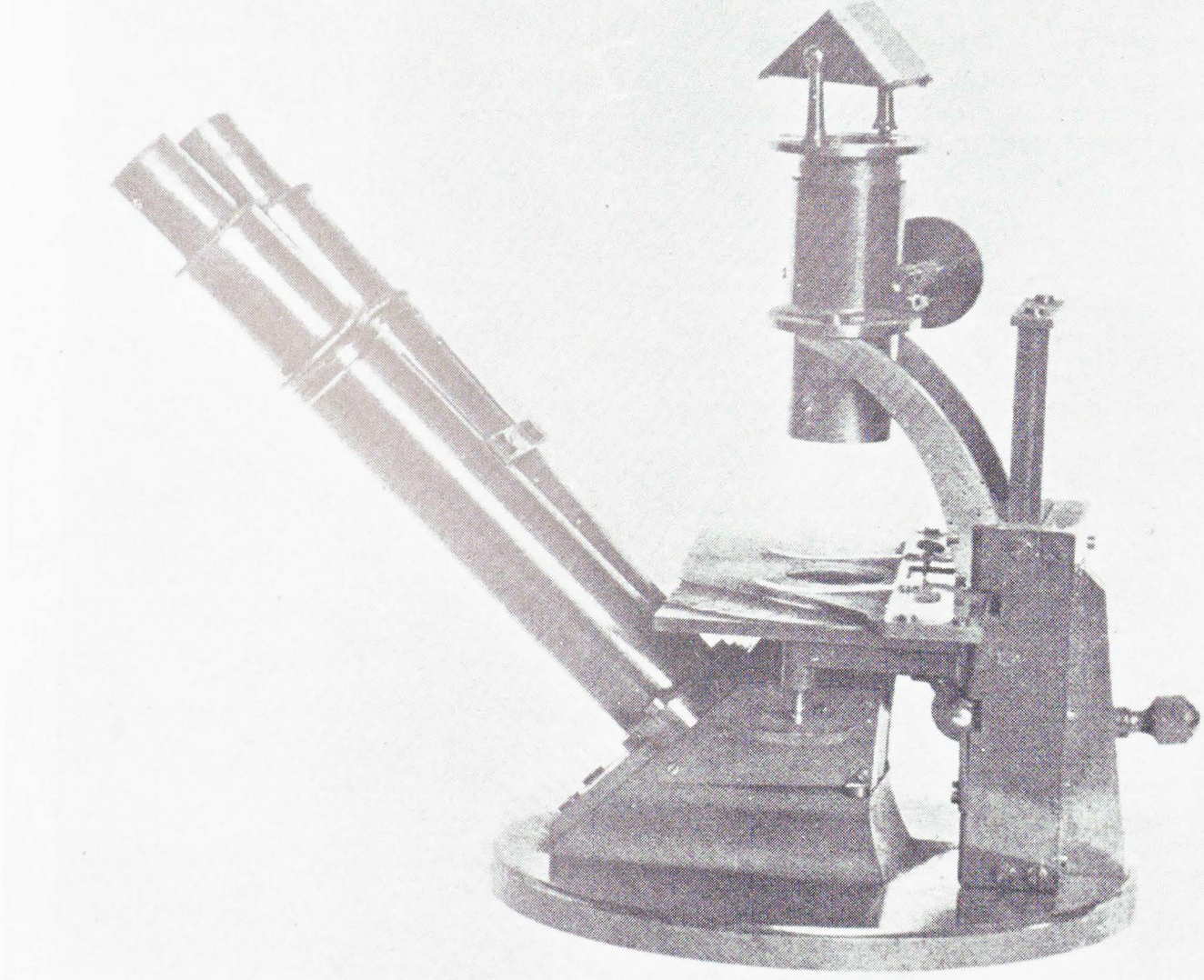


Figure 10. Riddell's binocular microscope (United States Army Medical Museum).

The museum instrument was described, with quotations from Riddell's papers, by Dr. J. J. Woodward in the *American Monthly Microscopical Journal* (1880) and reprinted in the *New Orleans Medical and Surgical Journal* (1881). There are numerous errors in the quotations in Woodward's papers.

Professor Riddell demonstrated his binocular microscope before the New Orleans Academy of Sciences on March 27, 1854. The Academy minutes note that

> "it is orthoscopic as to form, position and motions of objects under examination."
>
> New Orleans Academy of Sciences, *Minutes*

A committee, composed of Dr. Josiah Hale, Dr. Isaac Crawcour and Thomas Cerre Copes, was appointed to examine the microscope and report on its claims. The committee, reporting April 13, 1854, announced that they

> "unanimously concor in regarding Professor Riddell's invention—the binocular microscope—as supplying a great desideratum in microscopy. It gives correctly a third dimension to the visual field in that instrument, namely depth . . . (They) look upon it as a complete triumph."
>
> New Orleans Academy of Sciences, *Minutes*

The price of the instrument is given as $150.00.

Riddell's discovery of the principle of the binocular microscope has been erroneously credited to others. However, such early authorities as Pieter Harting (1866) and Heinrich Frey (1873) recognize Riddell's contribution.

> "Dem Nordamerikaner Professor Riddell gebuhrt das Verdienst, zuerst den wahren Weg angegeben zu haben, den man zur Erreichung dieses Zieles einzuschlagen hat."
>
> P. Harting, *Das Mikroskop,* 1866

> "Einem Amerikaner, Riddell, verdankt man die Herstellung der ersten Instrumente dieser Art."
>
> H. Frey, *Das Mikroskop,* 1873

However, Dr. William B. Carpenter, writing in 1875, fails to give Riddell credit, and indicates that M. Nachet of Paris solved the problem of stereoscopic vision. Actually, as Dr. J. J. Woodward points out, Harting had read Riddell's article, and called it to Nachet's attention. Nachet was already familiar with Riddell's basic design, but did make some modifications and did construct an instrument. Likewise no credit has been given Riddell by J. W. Stephenson who constructed an "erecting binocular microscope." Actually Stephenson's instrument is, in optical sense, Riddell's modified design. Stephenson did make some later changes which are beneficial to the design, but these in no way alter the basic principle, which is definitely Riddell's. Perhaps the British failure to recognize Riddell was due in part to the attitude of Professor Charles Wheatstone. Wheatstone had written on the subject of a binocular microscope and stereoscopic vision, but several months after Riddell's work had been published. He read Riddell's paper, and announced

> "The method Mr. Riddell employs is similar to the one I recommended to Mr. Beck."

But no instrument was made in England at that time.

In addition to the binocular microscope Riddell constructed a special achromatic and aplanatic object glass for a telescope which he described:

> "The front or terminal combination of the objective is made to condense light upon the opake object, by sending rays of light from behind, through the marginal border of the lens. To accomplish this, a circular disk of fine plate glass, say near a fourth or fifth part as thick as the diameter of the lens, is bevelled on its outer margin, by grinding and polishing to an angle of 45 degrees. A hole is drilled through the center of the disk, of a diameter say two-third, three-fourths or four-fifths (dependent upon the angle of aperture) as great as that of the lens. The margin of this hole is also bevelled at an angle of 45 degrees, down to a clean, sharp edge. Both rings of bevels are on the same side of the glass, so that if considered as projected, the lines would cross each other at right angles. I find no insurmountable difficulty in giving an exquisite form and finish to these disks."
>
> *American Journal of Science and Arts,* 1853, vol. 15, p. 69

He also constructed an achromatic condenser:

> "A larger, thicker, similarly bevelled disk, with the bevels on opposite sides of the plate glass, and their lines of inclination coincident, would probably serve as an efficient achromatic condenser of parallel rays."
>
> *American Journal of Science and Arts,* 1853, vol. 15, p. 69

This article was written October 4, 1852, immediately after his first presentation of the binocular microscope. Since Riddell ground and polished his own lenses, we know that the workmanship and precision of his optical apparatus was of very high quality, for he would not tolerate imperfection.

A paraboloid objective was also described, which would give reflection and transmission without refraction, so that it

> "renders both spherical and chromatic aberration impossible!"
>
> New Orleans Academy of Sciences, *Minutes*

One of his later papers (February 4, 1856) was on "The binocular magnifying glass simplified for the use of naturalists and artists," given before the New Orleans Academy of Sciences. For his presidential address the same year Riddell set up a demonstration of microscopic projection, and invited the members of the Academy and the public to view it.

> "Professor Riddell exhibited and described a small lorgnette or spyglass of the Galilean construction, consisting of an achromatic object glass and a concave eye glass to which he had adapted crosshairs with the view of attaching it to the surveyor's compass. Between the eye and the concave eye glass there is placed a perforated convex lens. Through this central perforation distant objects are seen as usual, while at the same time there is obtained through the margin of the perforation of the convex lens, a distinct view of the crosshairs behind the object glass."
>
> New Orleans Academy of Sciences, *Minutes*

"Plants of Louisiana"

In 1851 Riddell prepared the *Plants of Louisiana,* a flora of Louisiana which was sent, in manuscript form, to the Smithsonian Institution, Washington, D.C., but was never published. It was not completely original, for he used some of the materials of Professor W. M. Carpenter, and the *Cypreaceae* and *Gramineae* of Dr. Josiah Hale. The work described several new species and varieties found by Riddell. It is said that the manuscript described over 2,300 species. A portion of the manuscript was published in the *New Orleans Medical and Surgical Journal* as "Catalogus florae ludovicianae," which includes the following preface:

> ". . . It comprises the technical and the vulgar names of the flowering and filicoid species of plants, well ascertained as growing within the limits of the State of Louisiana, (nearly all of which are represented by specimens in the author's herbarium), with special localities, times of flowering, and full descriptions of the new species."
>
> *New Orleans Medical and Surgical Journal,* 1852, vol. 8, pp. 743-764

This portion of the original manuscript also appeared in pamphlet form in 1852.

Dr. Clair A. Brown of Louisiana State University, in a letter to Dr. King Rand of Alexandria, Louisiana, remarked that Riddell's original manuscript was sent by the Smithsonian Institution to the Gray Herbarium at Harvard University, where the manuscript was cut up and portions pasted on the sheets of specimens which accompanied the manuscript. Brown remarked that he had seen these in the Gray herbarium collections. The same statement were published in *Fern and Fern Allies of Louisiana,* by Clair A. Brown and Donovan S. Correll. These authors list 31 species of ferns and allies in Riddell's *Catalogus.* They refer to the excellent illustrations, some in water color, accompanying some of the specimens. A photograph of Riddell's water color of *Adiantum Capillus-Veneris* is given in Brown and Correll, from one of the Gray herbarium plates. This was one of the plants Riddell found on the Texas trip, in September, 1839.

Riddell discusses his *Catalogus* in a letter to Professor Asa Gray, October 5, 1851:

> "After an interval of some years, I have again devoted some attention to botany. I have for instance this past summer prepared a list of the "Plants of Louisiana" with descriptions of some 20 or 30 of what I suppose to be new species. The manuscript is in the hands of Prof. Henry of the Smithsonian Institute—a candidate for publication. I see by your 3rd Edition of the Botanical Textbook, 1850, that you are about issuing to the world a treatise on North American forest trees. Now in the Plants of Louisiana I have venture to name no less than 5 species of *Quercus* as new, viz: *Quercus rhombifolia, bumeliaefolia, Carpenterii, Peckiana* and *Q. andromeda.* If you desire it for your publication, I will forward you a transcript of my descriptions, and all I know about them; with (at least indifferent) specimens. So far as applicable, and in my power, I have taken your publications and the *Flora* of Torrey and Gray, as standard

authority. I am sure I have not all the books on botany, indispensibly requisite up to the present time. . .

"Many duplicate specimens I still have on hand, collected many years ago, from Louisiana and Ohio. if my "Plants of Louisiana should be published, you can mark the numbers which you may desire and if practicable I shall be happy to send them to you.

"I have a kind of sneaking vanity to place in my herbarium a sample of Nuttall's *Riddelia tagetina,* of which I suppose your extensive herbarium contains duplicates. If so, send me one by letter (or mail if that is a better way of expressing it).

"Where is Nuttall? When we shall see more of Torrey and Gray *Flora of N.A.*? If you do not hurry and give us a standard work on the Flora of North America I am almost half disposed to arm myself with scissors, paste and presumptions, and get together an abbreviated Flora of N.A.—a sort of manual—something on the plan of Eaton's, or rather on the plan adopted by Beck and yourself for the Northern States.

"Were there a good general work of this sort now extant—we should more students in botany—and more local investigators would be made. . ."

J. L. Riddell to Prof. Asa Gray,
Autographs, vol. 4, p. 116,
Gray Herbarium, Harvard University

A second catalog was published in the *New Orleans Medical and Surgical Journal* a year later, entitled "New and hitherto unpublished plants of the Southwest, mostly indigenous in Louisiana."

Riddell was also making microscopic observations on diatoms and algae, principally *Closteria* and *Oscillaria aureliana,* Riddell. He sought assistance again from Dr. George Engelmann, writing:

"Can you refer me to any one in St. Louis, who devotes some attention to the *Desmidiae, Diatomaceae,* and minute fresh water algae? I should be happy to exchange specimens with some amateurs in your locality. I am particularly desirous of procuring samples of Infusorial earth, from the Western States. As you are aware, half a dozen samples can be sent in a letter, without enhancing the price of postage. To anyone desiring suits I myself can furnish from this region, a number of interesting specimens.

"I do scarcely anything now in general botany.

"You should have in St. Louis some good microscopes and microscopists, who are fond of observing living and fossil infusoria."

Engelmann letters, Missouri
Botanical Garden, St. Louis, Missouri
August 20, 1854

Unfortunately Riddell did not give complete botanical descriptions of many of his new species and varieties, so modern botanists, using the currently accepted rules of nomenclature, do not consider his findings as original or valid. An illustration of changed nomenclature is *Dyopteris Rafinesquiana,* Riddell, now *Dyopteris normalis.* Another, *Dyopteris aureliana,* Riddell, now *Dyopteris versicolor.* Both species were collected by Riddell in the marshes near New Orleans, according to Brown and Correll. Another example, *Lycopodium corallinum,* Riddell is now listed as *Selaginella Riddellii,* Van Eseltine. Riddell found one specimen of this plant in the sand hills near Kisatchie Spring, in Natchitoches Parish, Louisiana. Brown and Correll comment that

"It is fitting that this species should bear the name of one of Louisiana's pioneer scientists. It briefly commemorates a scientific career rich in achievement."

Brown and Correll, *Ferns and Fern Allies,*
Louisiana State University Press, 1942,
185 pp., Baton Rouge, Louisiana

His botanical contemporaries had high regard for Riddell's work. Nuttall assigned the name Genus *Riddellia* to a western composite. The original species was *Riddellia tagetina,* and was supplemented by *Riddellia cooperi* and *Riddellia arachnoidea.* Rafinesque established Riddell's *Melothria pendula* as a new species, and also his *Sabbatia gracilis.* Riddell exchanged plants with Nuttall for many years. Nuttall credited him with another new plant, *Bollis heterophylla* Riddell.

The Riddell specimens now in the British Museum of Natural History are handsomely bound and have labels giving the location where the plant was found, and occasionally a comment about its habits. Some of these are in Riddell's hand, others not. A few of the specimens included are *Houstonia Frankii* Riddell, *Neomophila australis* Riddell, *Punicum exile* Riddell, and *Cardamine Ludoviciana* Riddell.

Molecular Forces

Eight years after the "Constitution of Matter" Riddell wrote his "Theory of Molecular Forces." In some respects it is a duplication of some of the earlier material, but it does contain some new ideas, such as a change in his forms of matter. He postulates solids and liquids and gases now, in terms of molecular forces:

> "The molecules constituting solids, are held in a fixed relation to each other by polaric force.
>
> "In liquids the molecules are in effect held equidistant from each other, (x), by virtue of a balance between the force of molecular attraction which in reference to an invariable plane varies as $1/x^4$, usually conjoined with a subordinate influence, external pressure, acting centripetally and impingent or collisionary repulsion which varies with the temperature and also varies as $1/x^3$ conjoined with polaric repulsion acting centrifugally. Considering the polaric repulsion as added to the molecular attraction then between the limits z = 1 and z = 4, the resultant attraction varies as
>
> $$1/x^z,$$
>
> z standing for some direct and continuous function of x. (x, it is to be remembered, is his variable intermolecular distance).
>
> "In gases, the molecules occupy also equal and equidistant spaces. External pressure mainly, and molecular attraction, varying as $1/x^4$, subordinately and for the most part inappreciably, act as the centripetal forces; while impingent molecular repulsion, varying with the temperature as $1/x^3$ acts centrifugally."
>
> *New Orleans Medical and Surgical Journal,* 1854, vol. 10, pp. 446-451

In this 1854 publication Riddell makes several curious statements about attraction and repulsion:

> "Such attractions between individual molecules or bodies as vary in intensity reciprocally as the square of the intervening distance must be generally borrowed from the omnidirective impulses, which pursue their endless rectilineal paths, in the different coextensive systems of refined media, with which boundless space has ever been furnished.
>
> "The crude hypothesis, that the more simple molecules, like those of oxygen, water etc. are usually revolving on axes with intense rapidity, enables us to form a conception of the possible cause of what may be called polaric attraction and repulsion. . ."
>
> "Repulsion among gasseous particles arises from their mutual impact, occurring in the transmission of molecular momentum . . . Molecular momentum is partly identical with heat. . ."
>
> *New Orleans Medical and Surgical Journal,* 1854, vol. 10, pp. 446-451

This paper, as may be seen from the extracts, does not have the import of the earlier "Constitution of Matter", but, in fairness to Riddell, it is not worthless or insignificant. This is particularly true of the ideas of molecular spin.

Medicine—General

Since Riddell had earned the degree of Doctor of Medicine it is logical that some of his best research would be in this field. His speculations on miasm and contagion, and his microscopic work, are the best known and most important contributions of a medical nature. Some aspects of his theory of permeation are really physiological, as are his experiments on the aerial impregnation of blood.

While at Worthington (1833) he designed a "galvanic device" for dissolving stones in the bladder. It is actually a modified catheter, designed to set up an electrical inbalance within the bladder, which would cause the dissolution of the stone. There is no record that the device was successful.

Since his early training at Worthington stressed the vegetable theory of medicine, his notebooks contain references to the treatment of syphilis and gonorrhea by means of a controlled diet, with no medicine of any type being used. Likewise in the treatment of cancer, which he recognized as

> "most peculiar to old people, mostly in the mammary glands of the female-face-lips-uterus,"
>
> *Depository*

he prescribed various ointments.

Riddell did extensive reading in medicine beginning with his Ogdensburg days, and occasionally took issue with the authors. He particularly objected to Beach's *American Practice* and his *Materia Medica.* He criticized Beach's

> "leaning to empyricism and self-aggrandizement; and too much inattention to systematic

> botany and the late researches in chemistry,"
> *Personal Journal,* vol. 8

pointing out many botanical errors in the two works.

His earliest experiments in physiology concerned the aerial impregnation of blood. He attempted to ascertain the

> "truth of Mr. Dalton's views . . . by tying a string around the leg of a living cat and cutting it off in warm water that has just been boiled (hot water perhaps). Then heat the water again to near boiling and see whether bubbles of air excape . . . I am well persuaded that no air of consequence would be found."
> *Personal Journal,* vol. 10

He altered the method in his next experiment, placing the cat's leg in a bladder filled with hot water.

> "Expel all air from bladder and in its mouth tie a phial filled with hot water. By this contrivance I would prevent the blood from interfering with accurate observation, and if air were extricated from the leg upon boiling, I could collect and examine it"
> *Personal Journal,* vol. 10

He was able to find about 1/10 cubic inch of air, and also air in arterial blood, urine and saliva.

> "So I have no doubt that air pervades every permeable part of the animal system."
> *Personal Journal,* vol. 10

Several versions of the cat experiment are recorded. On one animal an analysis was made for carbon dioxide, nitrogen and oxygen in the air which he had collected.

In his capacity as a chemist Riddell was often called on to do routine testing for poisons, as well as analyzing blood and other body fluids. Riddell believed the Marsh test for arsenic to be deceptive, but regarded as

> "infallible test the experimentum crucis-after producing the dark tache, to heat it in contact with air until it sublimes, and then examine the sublimate with the microscope. If octahedral crystals, perfectly defined and brilliant as diamond are seen, we may pronounce with certainty, for they are perfectly distinctive. He (Riddell) would not testify in court without this test."
> New Orleans Academy of Sciences, *Minutes*

Occasionally a complete analysis is given in his *Journal.* Most of these routine experiments were not published.

It was not until he had purchased his new Spencer microscope and perfected his binocular microscope that Riddell began a series of microscopic observations. His series, "Selected items of observation," later called "Selected items of microscopic observation," appeared in issues of the *New Orleans Medical and Surgical Journal.* Each paper contains excellent plates drawn on stone by Riddell himself. The four articles cover the microscopic organisms found in the waters of New Orleans and vicinity, the various types of infusoriae, algae, desmids, diatoms, blood corpuscles, samples of sputa and feces from cholera and tuberculosis patients, specimens from hospital and accident cases, etc., furnished Riddell by some of the most prominent physicians in New Orleans. In addition to the drawings Riddell comments briefly on each, citing the source and conditions, and commenting on the histology of the specimen. A single article, "Microscopic observations on the blood" appears in the *New Orleans Monthly Medical Register,* and one "On the histology of red blood," in the *Proceedings of the American Association for the Advancement of Science* in 1853.

The 1853 epidemic of yellow fever was one of the worst in the history of New Orleans. Riddell was one of a group of physicians to write a report on the epidemic, which was published in New Orleans by E. LaSere in 1854. He also wrote several letters on the causes of yellow fever, and three papers on his microscopic observations in cases of yellow fever. These were:

> "Transcript of the results of microscopic observations upon black vomit."
>
> "Microscopic character of the blood and black vomit in yellow fever."
>
> "Microscopical observations pertaining to yellow fever."

A paragraph from the minutes of the New Orleans Academy of Science deals with these papers:

> ". . . Professor Riddell said that some of the matter of black vomit which has been carefully preserved by Professor James Jones was found, after a time, covered with mould; and he inquired whether any physician present had observed similar phenomena. He conjectured that the spores of those organisms

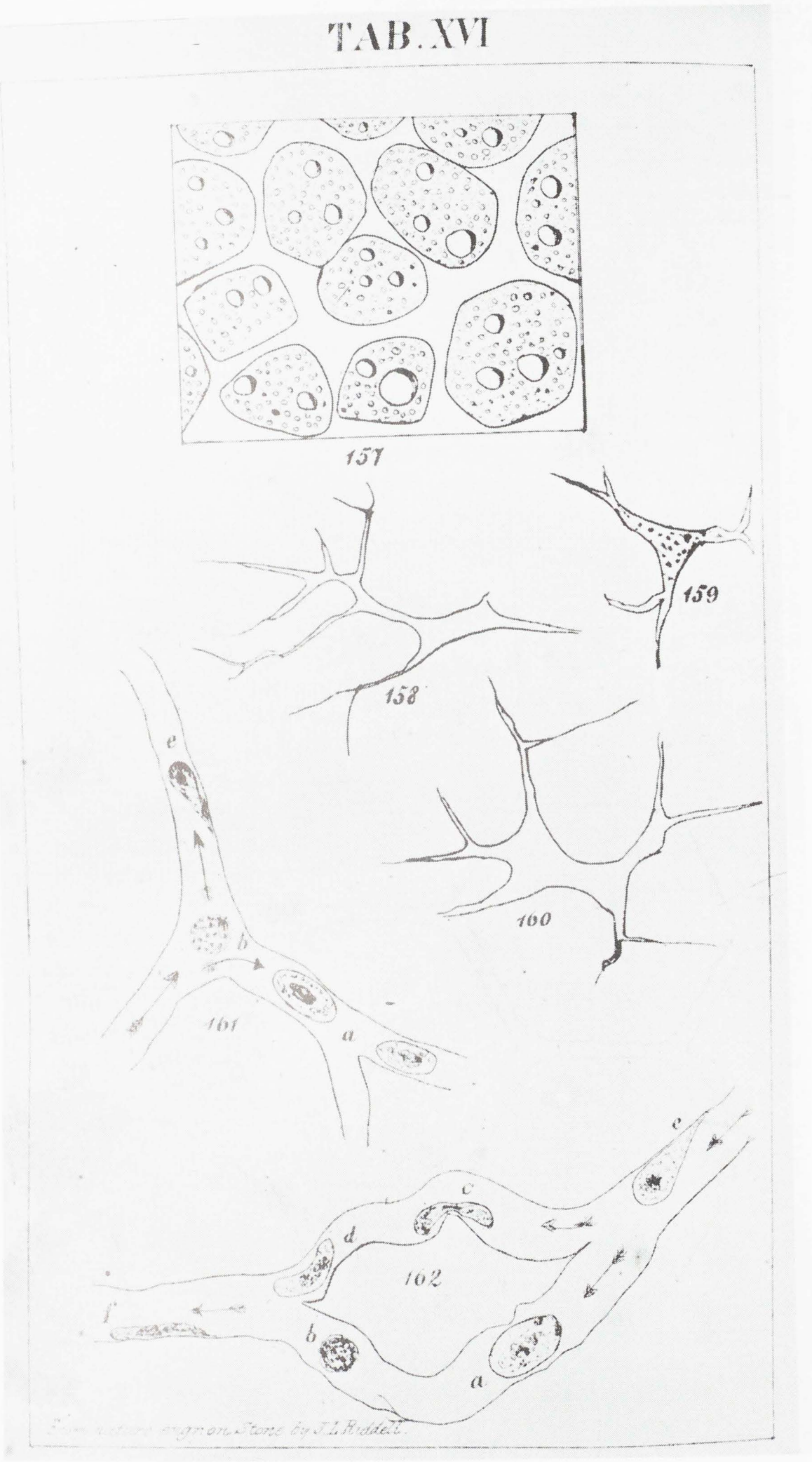


Figure 11. Microscopic observations, engraved on stone by Riddell *(New Orleans Medical and Surgical Journal,* 1852, vol. 9, p. 180/181).

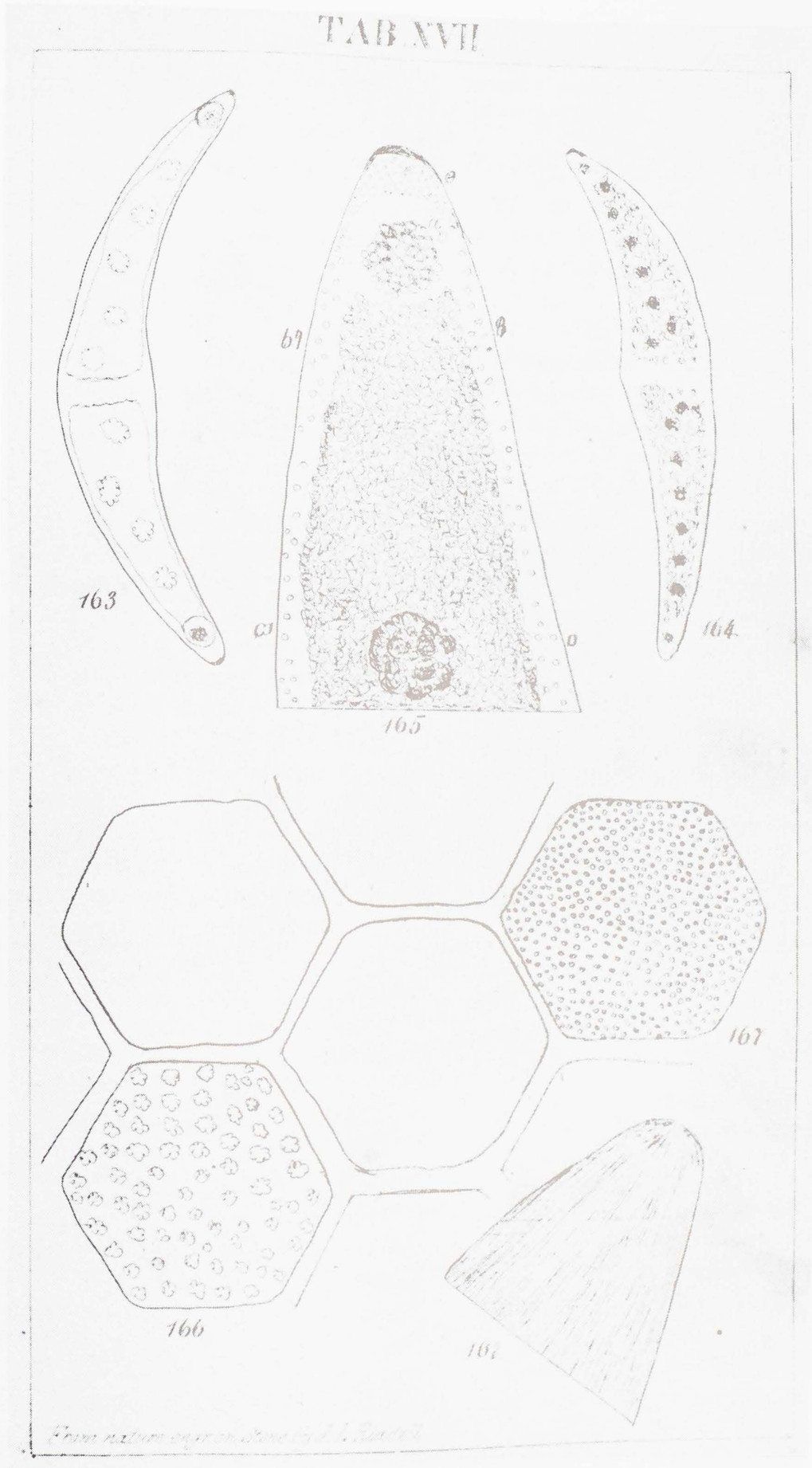


Figure 12. Microscopic observations, engraved on stone by Riddell *(New Orleans Medical and Surgical Journal,* 1852, vol. 9, p. 180/181).

> which produce yellow fever are of a kind which ripen not here but elsewhere, exposed to damp, confined air; that consequently they are brought here, not within the human body, but externally to it; and hence also the conveyance of yellow fever by fomites but not by human bodies, is readily explicable."
>
> New Orleans Academy of Sciences, *Minutes*

Thus Riddell was on the verge of the identification of the carrier of yellow fever, at least forty years before the work of Walter Reed and others.

Additional evidence of Riddell's theory of the cause of yellow fever is found in another entry in the minutes of the New Orleans Academy of Sciences, February 18, 1856. On that date Dr. Edward Hall Barton presented a paper on the "Agency of high temperature and moisture in the production of epidemic diseases." Riddell was in one of his most sarcastic moods that evening. He

> "paid a high compliment to the ability and research displayed in the paper . . . had nothing to object to the conclusions expressed as to the influence of high temperature, sudden changes of temperature, rains and terrene filth; but when the author leaves that field, to account for the production of yellow fever by a chemical formula made up of the four ingredients—solar radiation, high dew point, high temperature and terrene filth—he begged leave to declare his dissent."
>
> New Orleans Academy of Sciences, *Minutes*

He went on to illustrate his point by saying that the region of the River Ganges contains all four factors, yet no yellow fever. Dr. Barton tried to defend his paper, but Riddell, obviously enjoying the occasion, continued with

> ". . . if disease is generated by processes which are in any sense chemical, he would inquire of Dr. Barton how it happens that neither accident or design has ever produced any thing of the chemical laboratory?
>
> New Orleans Academy of Sciences, *Minutes*

Another set of experiments was performed with Dr. Duncan Macgibbon, on the muscular fibers of the hearts of persons dead from yellow fever, investigating these histologically and microscopically.

One of the annual features of the Medical College of Louisiana and its successor, the University of Louisiana, was a very elaborate and well planned introductory lecture given by each member of the faculty. Sometimes these were on subjects unrelated to any particular course. One of Riddell's most popular was that given November 16, 1852, "The chemistry, physics and vitality of organic cells." This was published by request in the *New Orleans Medical and Surgical Journal.*

At the Cleveland meeting of the American Association for the Advancement of Science, in 1853, Riddell presented four papers, one on the histology of red blood, one on the origin of capillary blood vessels, one on the theory of molecular forces, and one on the structure of *Oscillaria aureliana.* There is some question whether the third was actually read before the assembled delegates, or presented, as we express it, by title. The paper was published in the *New Orleans Medical and Surgical Journal* with the caption that it was presented at the Cleveland meeting. In his paper on histology of blood Riddell gave illustrations from microscopic examinations of alligator blood, human blood, frog blood and *Amphiuma* blood, with sketches. These were carefully prepared and show much detail. The paper on the origin of capillary blood vessels discusses the subject in terms of the development of the ova of the tree frog. The paper on *Oscillaria aureliana* was not published in the *Proceedings* of the American Association for the Advancement of Science.

At a meeting of the Physico-Medical Society, September 14, 1850, Dr. Erasmus D. Fenner read a paper on lead poisoning, contending that lead was present in soda water. Riddell, Dr. James Jones and Dr. A. F. Axson were appointed by the Society to investigate Fenner's claim. The committee disagreed with Dr. Fenner, but were of the general opinion that all water passing through lead pipes contained a detectable quantity of lead. These findings were published as "Report of a committee of the Physico-Medical Society of New Orleans on lead poisoning," in the *Transactions of the American Medical Association.* A similar paper, dealing with "Fatal poisoning from sugar plums" appeared in the *New Orleans Monthly Medical Register.*

On another occasion Riddell spoke prophetically about the virtues of saline springs.

> "The Creator has wisely adapted our bodies to those very conditions which are most commonly found throughout the world we inhabit. None of these conditions is more constant than the presence of saline matters in all waters that are employed for drink; and their absence or great deficiency is a common cause of disease. A case in point is the great prevalence of goiter in districts where pure snow water is the only kind used. It is most remarkable that many of the mineral impregnations of water are in quantities which almost defy detection by chemical tests; while at the same time this infinitessimal division of them, afforded by water alone, is the most effectual way of introducing them."
>
> New Orleans Academy of Sciences, *Minutes*

Riddell was consulted in the preparation of the remains of Judah Touro, prominent New Orleans philanthropist, for removal to New England for burial. Riddell was asked to prepare the proper preservatives.

> "He . . . advised that the body be surrounded with charcoal with the additional intermixture of acetate of lead and sulfate of iron. He was happy to say that the result proved perfectly satisfactory."
>
> New Orleans Academy of Sciences, *Minutes*

From the medical viewpoint Riddell's views on capillarity were definitely wrong. He proposed:

> ". . . I suppose in accordance with my own theory of muscular motion, that the nervous influence (electricity) has the power to invite blood (arterial) . . . perhaps no blood can pass through the capillary system which does not undergo a change. I do not suppose the tension or pressure of blood in cases of congestion is not greater than usual. But that the circulation is more rapid because it is permitted to pass into the veins."
>
> *Repository,* vol. 7

Riddell sought to explain animal secretions by means of his permeation hypothesis, which provoked Dr. T. V. Morrow at Worthington. Morrow believed that the brain was compressible, and that

> "the brain moved up and down with the systole and diastole of the heart."
>
> *Personal Journal,* vol. 8

Riddell's point of view was that the brain was

> "perfectly saturated with liquid,"
>
> *Personal Journal,* vol. 8

and therefore incompressible, and devised an experiment with a chicken brain to demonstrate his point. The experiment justified his hypothesis.

Another hypothesis was that apoplexy was due

> "to a congestion and rupture of the blood vessels of the encephalon rather than a compression of the brain."
>
> *Personal Journal,* vol. 8

In some places in his notes he supported the incompressibility of the brain, but in others he permitted the brain some freedom of motion. He attempted to explain the uses of the ventricles and sinuses of the brain by allowing some motion to that organ. He tried to design an experiment to note the movement of the brain during mental stimulation. He was convinced that respiration, the heart and muscular contractions communicated motion to the brain.

Miasm and Contagion-Animalculae-Infectious Diseases

During the Worthington period (1833) Riddell noted his reasons for believing that contagious or infectious diseases were caused by some sort of animalculae. He wrote:

> "I draw a negative argument from the chemical action of inorganic agents. I take this broad position—that when a body acts by virtue of chemical affinity that body becomes expended, in proportion as the action advances. Hence the extent of the effect produced is entirely dependent on the quantity of the agent. Now if contagious effluvia were poisons of an ordinary character, an inappreciably small amount could not produce an indeterminately great effect; while the effluvia seems rather to gather strength from their morbific action, than to become expended like bodies under the controul of chemical affinity.
>
> "Analysis shows us that when the atmosphere is apparently replete with morbific poison that the chemical composition of the air does not vary sensibly from the usual standard: that if there be some subtile pestilential gas or vapour present its quantity must be exceedingly small, wherefore admitting its presence and reasoning on the atomic theory, we could not anticipate any considerable effect.
>
> "But the action and unlimited propagation of contagious matter agree well with the laws of animal nature.
>
> "A law seems to pervade and controul animal nature, as well as the vegetable kingdom, recondite indeed in its nature, but not the less

obvious in its effects. I refer to the degeneration of races. One race or variety will flourish for a time and prevail, but at length it degenerates and is succeeded by another race or variety which has its day and yields its peace in turn. The Indians are disappearing from the forests of North America, and the whites are increasing and occupying the lands. The mammoths, plesosauri, lycadeae, etc. of ancient times are now unknown. This year the maples and buckeyes were infested to an incredible extent by the larvae of a small yellow miller. A year or two hence these insects will probably be almost unknown while some other species of insect may infest the same or other trees.

"No thinking mind can fail to observe an almost perfect analogy between the prevalence and succession of epidemic diseases, and the succession and prevalences of the races adverted to. Animals indeed are infested after this manner by insects visible to the naked eye.

"I cannot but believe that many morbid alterations of structure in the same animals frame bear about the same relation to animals in general—that many species of fungi do to the more perfect subjects of the vegetable kingdom. I allude to warts, cancers, ringworms, wens, perhaps, tubercles, sarcomatous tumours, hydatids, etc."

"It seems to me that the component elements of the animal machine are combined and retained in an unnatural condition by the living principle, or to speak more correctly, in a condition which dead matter has power neither to assume nor retain, it seems to me, I say, that a certain degree of health and energy of the living principle is essential in order that it keep the particles of dead matter over which it is destined to rule, in subjection. That when the living principle does not possess the requisite degree of health and energy then the system is in a condition to favour these fungous growths—in a condition more obnoxious to the depredations of animalculae."

Repository, vol. 4

These thoughts were embodied in Riddell's thesis: "Memoir on the nature of miasm and contagion," which was read before the Cincinnati Medical Society, February 3, 1836, and printed in the same year in the *Western Journal of the Medical and Physical Sciences.* The paper attracted wide attention, and was reprinted in the *United States Medical and Surgical Journal,* and reviewed in the *New Orleans Medical and Surgical Journal.* In essence Riddell advocated that contagious or infectious diseases were caused by

"organized and living corpuscles of various kinds,"

Western Journal of Medicine and Physical Science, 1835, vol. 9, pp. 401-412

that is, he proposed that contagious diseases were caused by bacteria.

Perhaps the clearest presentation of the topic was given by Riddell at a meeting of the New Orleans Academy of Sciences on October 10, 1853, when Riddell attacked a paper by Dr. Isaac L. Crawcour on the cause of epidemics. Riddell stated:

". . . the cause of epidemics is an organic one. He was not prepared to say that it was either vegetable or animal, that it was not of a kind totally different from either. In illustration of such possible existences he alluded to that remarkable class of organisms revealed by the microscope, the Diatomaceae, which are invested with a silicious covering, and which seem to be intermediate between animals and vegetables, partaking of the nature of both. The "period of incubation" which, as is well known, is a characteristic of epidemics, as it is of the evolving of insect life, or the germinating of seeds . . . would seem to be conclusive against the hypothesis of either mineral or meterological causes, which act at once."

New Orleans Academy of Sciences, *Minutes*

At an earlier date, in a lecture to his students at the University of Louisiana, November 18, 1851:

". . . in the microscopic world beings are often met . . . which seem either or both animals and plants . . . as to the relations of animals and plants among each other it can safely be said that they prey upon each other to the full extent of their power."

New Orleans Medical and Surgical Journal, 1852, vol. 8, p. 468

As noted in DeBow's *Commercial Review* (1850):

"Dr. Riddell of New Orleans recently found the monads from boiled peas, just as active as if they had not been subjected to high heat—has found the cholera insect alive, in water condensed from the breath of a cholera patient in collapse—has subjected the monads from human blood globules, to four hours immersion in caustic potash—and still they lived and danced; and I have seen through his wonderful Spencer lens, the same (apparently) monadic animalculae in paints, reduced in distilled water, sporting about the particles of pigment, as if they had not been imprisoned,

probably in the resin, since the paint was manufactured."

Commercial Review, 1850, vol. 9, p. 158

In another experiment

"Sediment from smallpox water (kept hermetically sealed) consists of numerous irregular partly filamentous ragged masses."

Personal Journal, vol. 14

Riddell confirmed his belief in the germ or bacteria theory in these words:

"That miasms and contagion . . . might be minute germs of vital organisms had been vaguely suggested by various writers at various times. Linnaeus entertained that opinion. It was hinted at by the ancients. But the controlling reasons which give confirmation to such an opinion I have never seen adduced by any writer prior to the publication of my memoir."

New Orleans Academy of Sciences, *Minutes*

The memoir referred to, obviously, is his thesis on miasm and contagion (1836).

With the development of his binocular microscope and the many subsequent observations on animalculae, bacteria, body fluids, etc. Riddell was more than ever convinced of the correctness of his theory. In a lecture February 28, 1859, before the New Orleans Academy of Sciences, he described many bacteria, particularly

"one most active little worm, about 1/4000 of an inch long, by 1/40,000 of an inch in thickness along the middle, with both ends alike rounded and enlarged to 1/25,000 of an inch in diameter,

New Orleans Medical and Surgical Journal, 1859, vol. 16, p. 359

which was, he reasoned,

"connected in some way with cholera,"

New Orleans Medical and Surgical Journal, 1959, vol. 16, p. 359

and

". . . rather plants than animals."

New Orleans Medical and Surgical Journal, 1859, vol. 16, p. 359

These microscopic examinations gave ample proof of the organic nature of disease, although Riddell did not clearly identify the bacteria as such. The cholera and tuberculosis bacilli are clearly shown in some of Riddell's drawings. Other materials examined microscopically included blood – human, frog, *Amphiuma;* "moving monads"; vegetable cells; frogs; "ova found on the surface of a puddle of rain water;" capillary vessels, and various protozoans and algae. These observations, made in the 1850's, were with his Spencer instrument, for which he had paid $120, rather than his binocular instrument.

In his Volume 18 of the *Personal Journal* Riddell mentioned that he had borrowed Dr. Edward Hall Barton's lecture notes on miasm, had copied the main points, and inserted comments of his own. These substantiate his early ideas on the nature of miasm and contagion. Barton's statements were shown by Riddell to be capable of interpretation on the basis of the organic theory of miasm and contagion, as well as on Barton's preferred basis of meteorological and external events. Barton's points were:

1. "Miasm is produced and propagated by a temperature not less than 40 degrees nor more than 100 degrees in putrifiable material.
2. "It is evaporated or suspended by heat during the day and falls in the cool of the evening or night.
3. "Miasmata are said to be most abundant in stagnant marshes, ponds, etc.
4. "Winds protect from the influence of malaria.
5. "A covering, as a house, shed, trees, mosquito bars, etc. protect from the influence of malaria.
6. "Flannel is known to be a great protection against the influence of miasm in sticky climates.
7. "Great protection is supposed to be rendered by a grove of trees, a high wall or other such impediment, intervening between a marsh and a house or town.
8. "Elevated positions over or near swamps are often sickly and sometimes eminently so.
9. "The effects of malaria are arrested by frost."

Personal Journal, vol. 18

Riddell noted that the range of temperature specified in (1) was the most favorable to organic life, and agreed with (2) because the

"miasmatic corpuscles . . . became entangled in the dew which is deposited."

Personal Journal, vol. 18

In reply to (3) he noted that mosquitoes, gnats and other insects, infusoria and algae are most abundant in stagnant areas. In reply

to (4):

> "Miasm is thus distributed and attenuated by the winds. Besides I conceive the deposition of dew to be greatly and perhaps essentially instrumental in bringing miasm to act on the system. Now in windy weather dew is very seldom deposited."
>
> *Personal Journal,* vol. 18

In reply to (9):

> "So are the effects of mosquitoes, gnats, ants, etc. Living and organic nature is dormant below the freezing point of water. Some animals and plants, it is true, maintain for themselves a higher temperature than the cold medium around them, and are consequently more or less active. But a vast majority of organic beings die upon the approach of a northern winter, leaving merely dormant germ, ova or sporules to continue the future existence of their respective races. How well this proposition harmonizes with the organic theory of miasm. How irreconcileable with any other! As to vicissitudes of weather do we not have them in winter? Yet certain kinds of miasmatic diseases never originate in winter."
>
> *Personal Journal,* vol. 18

The Riddell-Barton controversy erupted again in 1854 following a paper of Barton's on the cause of epidemics. Barton believed that epidemics were caused by a

> "poison, generated and diffused (conveyed) through the atmosphere."
>
> New Orleans Academy of Sciences, *Minutes*

Riddell wanted to know more about the poison.

> "It must be organic, he indicated, not sure whether it is animal or vegetable. Must be due to some form of organism."
>
> New Orleans Academy of Sciences, *Minutes*

Barton agreed that organisms were probably involved, but also stressed the dependency of climate on epidemics. Riddell

> "could not grasp how heat and moisture alone could account for epidemics,"
>
> New Orleans Academy of Sciences, *Minutes*

and stated flatly that

> "two distinct epidemics can never coexist in the same community."
>
> New Orleans Academy of Sciences, *Minutes*

XVII. THE POST OFFICE AT NEW ORLEANS – 1860-1863

Perhaps the most colorful portion of Riddell's life was the last five years. He was appointed Postmaster of the City of New Orleans by President James Buchanan, August 1, 1860, and took office on August 16, succeeding S. M. Marks. Riddell served during the troubled months preceding the Civil War, during the War prior to the occupancy of the city by the Northern troops, and also during the occupation until February 19, 1863. His tenure in office was the result of unusual circumstances. When the Confederate authorities took over the postal system June 1, 1861, J. M. Reed was appointed Postmaster of New Orleans. He was not confirmed. Then Lionel Berthe was appointed and confirmed, but did not take office. Hence Riddell was in office when the city was occupied by the Northern troops, and remained during part of the occupation under Major General Benjamin Franklin Butler.

Riddell's initial appointment as Postmaster was unusual, even though he was active in Democratic circles, because of his previous difficulties while at the Mint in the 1840's. He was responsible, nevertheless, for a curious chapter in the history of the New Orleans Post Office.

In May, 1861, Riddell wrote to Montgomery Blair, Postmaster-General, asking what he should do in case of war. Blair replied on May 18, indicating that he should take steps to preserve the funds and property of the United States Government, but gave no specific directions.

Following the declaration of hostilities Riddell announced to the citizens of New Orleans that it would be advisable to dispose of any quantities of United States stamps which they might have on hand, since they would be of no value during the Confederate administration. On June 1, 1861, the postal system of the Confederate States went into operation. New postal rates were announced, and arrangements made for the transmittal of mail to and through the United States, and to foreign countries. Riddell was advised by the Confederate Postmaster-General, John A. Reagan, that some arrangements must be made for prepayment of postage until regular stamps were available. Riddell, always full of initiative, made arrangements with John V. Childs, an engraver and printer,

on June 6, 1861, to prepare a series of stamps, now known as the New Orleans Postmaster Provisionals. This was reported in the local press as follows:

> "STAMPS FOR THE NEW ORLEANS POST OFFICE: Our energetic Postmaster, Dr. J. L. Riddell, has made arrangements with Mr. John V. Childs, the engraver, No. 10 Camp Street, for the engraving of five cent stamps to be used exclusively for the mailing of letters at the New Orleans Post Office, and intended principally for the convenience of our citizens, under our new postal arrangements.

Figure 13. Riddell's two cent Postmaster's Provisional Stamp (courtesy of a New Orleans collector).

> "The stamps are very neatly and handsomely engraved, and will be ready for distribution by the end of the week.
>
> "In mailing letters over 500 miles distance, within the Confederate States, the postage will be ten cents for single letters, and 2 stamps must be affixed. In mailing letters for any foreign State, either in or out of the United States, the United States postage stamps heretofore used must be added.
>
> "We learn that ten cent stamps will shortly be adopted. This will prove a great facility and convenience to our citizens, and Postmaster Riddell deserves the thanks of the community for his enterprise."
>
> *The Daily Picayune,* New Orleans, Louisiana, June 6, 1861

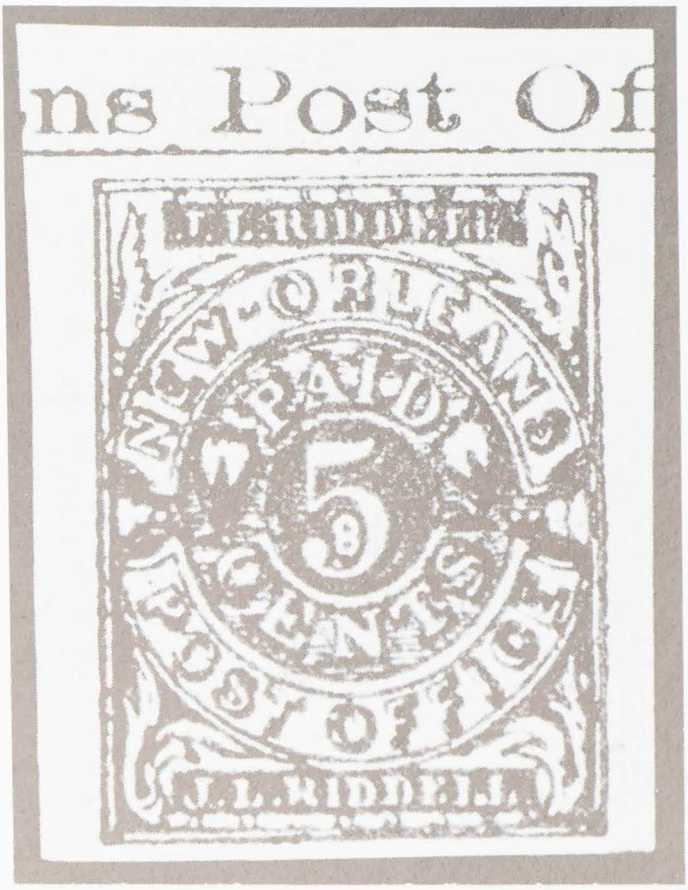


Figure 14. Riddell's five cent Postmaster's Provisional Stamp with part imprint at top (courtesy of a New Orleans collector).

In addition to the postage stamps Riddell ordered a series of stamp checks or paper currency, in denominations from one cent to five dollars, for making proper change on the purchase of stamps. The first stamp was a 5¢ brown, with Riddell's name across top and bottom, and was sold at the New Orleans Post Office beginning June 12, 1861. The impressions were made from a wood cut, and appeared in sheets of forty. The second stamp was a 2¢ blue in a slightly different design. Later, the 2¢ stamp appeared in red. A 10¢ stamp, although mentioned above, was never issued. Eight different basic types

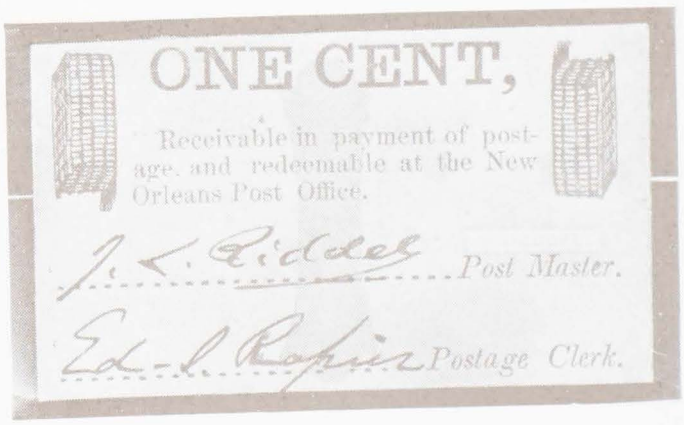


Figure 15. Riddell's "stamp money", one cent denomination (courtesy of a New Orleans collector).

are recognized by philatelic authorities today. Printings were on different grades of paper of white, bluish and yellowish shades. The figure "5" on each stamp contains a small figure "8" within the curve of the "5". The inscribed figures are not all alike, and the significance of this is not known. The new stamps met with the immediate approval of the citizens.

> "All foreign letters mailed at New Orleans for foreign countries have, up to this date, been sent to Washington, and our Post Master thinks they will be forwarded to their destination. He is of the opinion that the Lincoln Government will not stop foreign mails and he has determined to send letters forward to Washington.
>
> "The five cents stamp issued by Post Master Riddell, are now ready for delivery; yesterday five hundred dollars' worth were sold. The plate from which the impressions are made cost only forty-one dollars. Dr. Riddell has written to the Department at Richmond, to have the Post Master General approve of these stamps, when he will issue ten cents and two cents stamps. They have already proved a great convenience to our people and saves great loss of time in making change."
>
> *The Daily Picayune,* New Orleans, Louisiana, June 13, 1861

There was one slight difficulty. Postmasters outside of New Orleans did not accept the stamps and indicated that Riddell was guilty of illegal practice when issuing them. The *Caddo Gazette* of Shreveport, Louisiana, called the stamps

> "bogus stamps . . . They are perfectly worthless, and we advise persons not to purchase them."
>
> Huber and Wagner, *The Great Mail,* p. 145

Riddell was forced to state publicly that the stamps were intended for use in New Orleans, and nowhere else. He added to each sheet of stamps an imprint, top and bottom,

> "Usable exclusively in the New Orleans Post Office."

Even though the regular Confederate States stamp issues were available in New Orleans in 1861, the provisionals were used throughout that year, and until the fall of the city, April 25, 1862, and its subsequent occupation.

Philatelists have detected some forgeries of these stamps, and also certain irregularities in the plates themselves. In addition to the adhesive stamps Riddell issued provisional hand-stamped envelopes, in 2¢, 5¢ and 10¢ denominations, with the stamping made from brass hand stamps. There are two types, one containing simply

PD. CTS.
N.O.P.O.

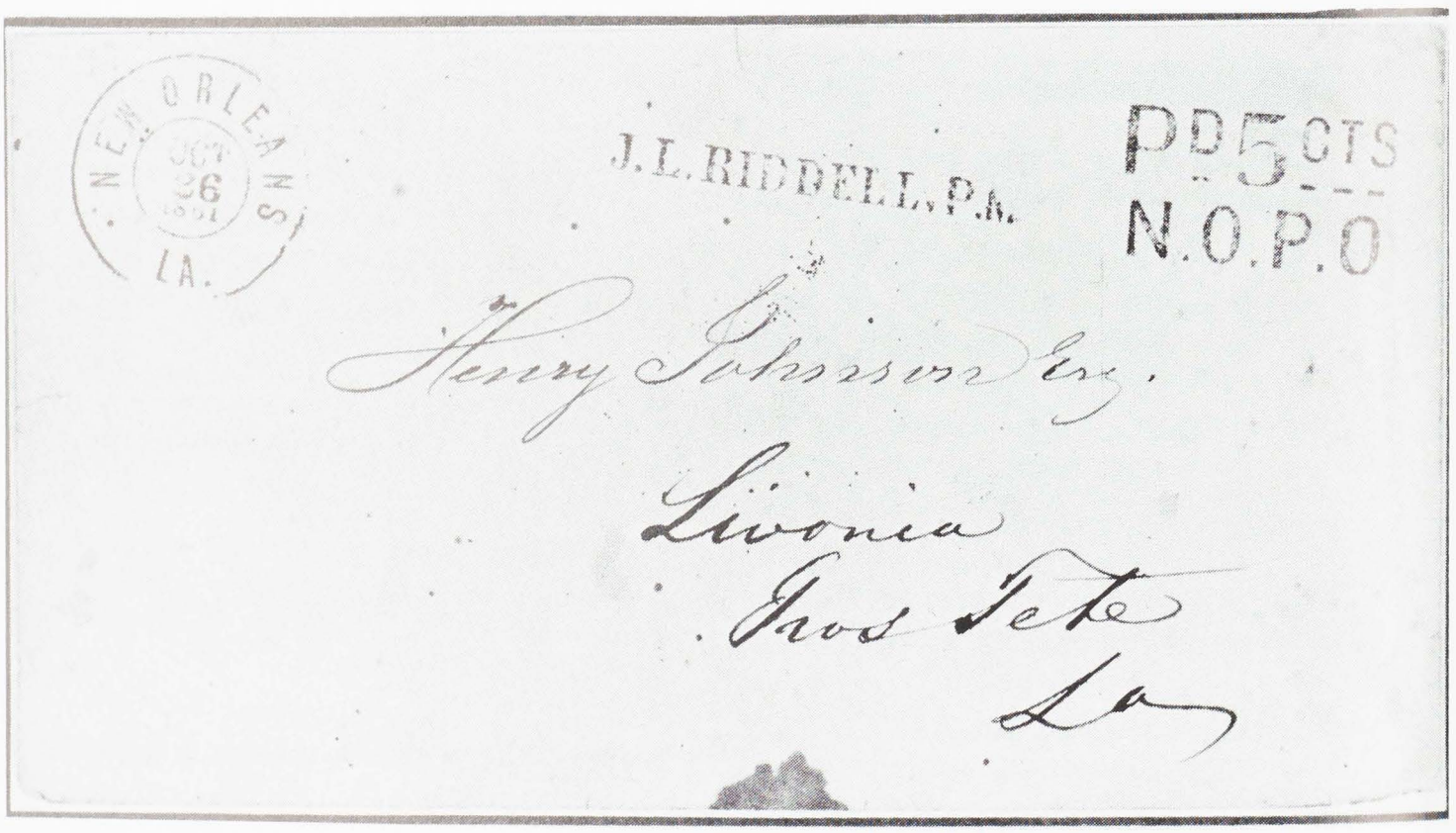


Figure 16. Riddell's handstamped five cent Postmaster's Provisional Envelope (courtesy of a New Orleans collector).

with the appropriate numeral inserted; the other adding

J.L.RIDDELL, P.M.

Riddell also mapped out a blockade-evading route via Texas and Mexico, with the firm of Antonio Costa, a well known commission merchant of New Orleans, for messages and mail.

There is a story that Riddell

> "secreted a number of United States stamps by plastering them into the wall of a building in the old French Quarter in New Orleans, near the site of the post office at that time."
>
> A. E. Waller, *Ohio State Archives and Historical Quarterly,* 1945, vol. 54, pp. 331-360

It is said that he sent the serial numbers of these sheets to the Postmaster-General in Washington. This was regarded as a "treasonable act" against the Confederacy by some of the New Orleans citizenry. Consequently Riddell had occasion to fear for his life. Whether or not this is true, we do not know. The serial numbers nor any correspondence from Riddell on this matter are not now in the Archives of the Post Office Department.

The *Daily Delta* of New Orleans, March 18, 1862, carries the following "Correspondence":

CORRESPONDENCE

New Orleans Post Office, March 12, 1862

To Messrs. J. P. Labouisse
M. Garcia
J. Nicholson
Rich Esterbrook
Thomas Murray

Gentlemen — I have the honor to acknowledge receipt this day of the following procesverbae of proceedings and resolutions, presented to me in this office by yourselfs personally:

(Copy)

CASE OF DR. J. L. RIDDELL

Resolved that a report be made to the association in the case of J.L. Riddell, recommending that a committee of the association be appointed to wait upon him and demand, in the name of the association:

1st. That he immediately resign his office of Postmaster, and forward same to the Postmaster General, in the presence of the committee.

2nd. That he cause an advertisement to be inserted in the public newspapers that he is willing to receive, from all persons indebted to him personally, for rents and otherwise the currency of the Confederate States at par.

3rd. That said committee be further instructed to inform Dr. J. L. Riddell that, in case of his refusal to comply with said requisitions, he will be considered an enemy of the Southern Confederacy, and dealt with accordingly.

J.P. Labouisse
M. Garcia
J. Nicholson
Rich Esterbrook
Thomas Murray
Committee

Ever since the suspension of specie payments by the banks, even to the present time, I have incurred a great deal of undeserved blame, by demanding and collecting specie in certain cases of postal and postoffice dues, and it has been ten thousand times asserted, and many time printed, that I was thus wantonly bringing discredit upon the Confederate treasure notes. But I defy the most searching investigation to show an instance where I was not acting in precise accordance with the laws of the Confederacy and in accordance with instructions from the Postmaster General. Quite lately I have been apprised that there has been got up in this city against me, a great excitement and terrible prejudice, because it was alleged that I refused to receive treasury notes in payment of a private debt, thus aiding to depreciate said note. The fact is that, excepting debts in one case, I never have refused to receive treasury notes for rents, notes, sales of property, etc., and I have no objection to notify the community, that from the lights of me, I shall continue to receive them. The solitary exception is the case of Dr. J.S. Knapp, which has been the cause of excitement and prejudice just before alluded to. In this case, as can be seen by reading Dr. Knapp's letter below, there is really no feature that can properly be construed into disparagement of treasury notes:

(Copy)

Dr. J.L. Riddell:
Dear Sir: I regret to learn that money transactions between us have been the occasion of great blame imputed to you by some of the community. I admit that early in February I had more then Confederate money enough to pay my note held by you and falling due early in March. You asked me for it in exchange for my note, and on which occasion I asked you to continue to hold the note for another year, to which you agreed. Subsequently, receiving more money that I expected I was desirous of paying it, and offered to pay. You replied that expecting to continue my note, you had already, at some trouble, raised money to

meet your own maturing obligations. You never intimated to me that you would demand coin from me, but in lieu you promised to receive the Confederate notes when your taxes became due.

I had no wish to make our transaction public, or in anyway to cause you to be blamed. My object in making the notarial tender was merely to stop the interest, which the notary informed me would be the effect of the legal tender.

Very respectfully yours,
Jas. S. Knapp — 15 Baronne St.

I reply to you, gentlemen, because I think that every communication respectfully worded and signed by any of my fellow-citizen, of the standing which you hold in the community, demands respectful answer. But I cannot acknowledge the authority or right of any person or persons, not clothed with some legal mantle, to inquire into and pass judgment upon my private affairs or my official conduct. Still less can I acquience in an unfriendly judgement passed upon me in secret by a self constituted tribunal, without opportunity of hearing the indictment or being heard in my own defense.

In your first resolution, you demand that I shall immediately, and in your presence, resign the Postmastership. I assure you, gentlemen, under existing circumstances, I have no wish or desire to hold the office. Whenever it pleases the Government to relieve me, I shall relinquish it to a successor duly appointed and qualified. Until then, if life be spared, I have given bonds and sworn faithfully to perform the duties of the office. Make your complaints and substantiate your charges if you have any, before the Postmaster General, and you will be heard and heeded. For me to voluntarily or otherwise abandon the office now, would result in great public inconvenience, and perhaps great losses. To resign forthwith, under the threat of otherwise "being considered an enemy of the Southern Confederacy, and dealt with accordingly," might give color of possibility that I was really so, which I totaly and solomnly deny, and challenge the production of proof. You say your society numbers thousands of men; doubtless strong in organization and potent and prompt to carry out your purposes. I am but one man and my life may pay the forfeit of the position I now take, but I owe it to myself and to those who bear my name and must inherit my character, to do no single act which could cause them to blush for their sire.

Respectfully, your obedient servant,
J. L. Riddell, Postmaster

The Great Mail, a history of the New Orleans Post Office, by Leonard V. Huber and Clarence A. Wagner, carries a paragraph about Admiral David Glasgow Farragut's expedition to take formal possession of the Custom House, where the Post Office was located, April 29, 1862:

> "... The two officers in command entered the Custom House where they were met by Dr. Riddell, who received them cordially and remarked,
>
> "Thank God that you are here. I have been a Union man all the time. I was appointed by Buchanan and not by Jeff Davis: he only allowed me to remain."
>
> "Riddell then showed the little group to the roof of the building and was present when the Stars and Stripes was again hoisted over New Orleans."
>
> Huber and Wagner,
> *The Great Mail,* p. 150

On May 3, 1862 Riddell wrote to General Benjamin F. Butler:

> "I desire you to send me to the above address a pass to enter the Post Office, that I may finish hunting over the debris left by the late mob, for the vouchers, etc. I also desire to arrange my accounts and remove some little private property belonging to me, one item of which is three hundred pounds of bacon, now needed by my family.
>
> "I was appointed Post Master of New Orleans in Aug. 1860 by President Buchanan. I found myself in charge of the office of the office when the Confederates took possession, June 1st, 1861. They shortly afterwards appointed J.M.Reed, Postmaster, who was not confirmed. After six weeks they appointed and confirmed Lionel Berthe as New Orleans Postmaster but he failed to take possession of the office. I have never formally resigned the U.S. appointment. I have sent my last account to the Post Office at Washington on the 27th. day of Aug. 1861. If I remember right, the Department gave me great credit for a satisfactory settlement, I having paid drafts for the Department in final liquidation as late as the middle of Aug. amounting to nearly $150,000 after the seizure of the mint on Jan. 1861.
>
> "I received in answer to my inquiries from Postmaster Gen. Blair minute instructions dated May 18th, 1861 as to the proper course for me to pursue under the anomalous circumstances that existed or likely to occur, which instructions I followed.
>
> "As a matter of course, I fell under the suspicion of individuals and secret societies and it

has taxed my powers of watchfulness and prudence to preserve my life from the mob to this time, although I have resided here for 26 years.

"At the present time I consider my life in danger. Under all the circumstances I feel assured in advance that you will grant me the pass and permission which I request.

"I have kept so far in safety some twelve or fourteen thousand dollars worth of U.S. postage stamps and stamped envelopes and I would ask you if practicable to point out some opportunity for their return to the Post Office Department, Washington City, as they are all of the old, and, as I understand, repudiated pattern and therefore useless, except as vouchers or perhaps you may think preferable to have them enumerated and destroyed by a commission of your own appointing."

Huber and Wagner,
The Great Mail, p. 150

In Burton J. Hendrick's *Statesmen of the Lost Cause,* the following paragraph concerning Riddell appears:

"Pickett carried the precious packet in person to Dr. Riddle, Postmaster of New Orleans. He explained to that functionary the nature of the contents, enjoining the utmost care and secrecy in forwarding the documents to Richmond. Dr. Riddle, greatly impressed, promised that he would give his personal attention to ensure safe transmission. This promise was carried out only too faithfully. For this Dr. Riddle was a spy in the employ of the Federal Government. Instead of sending the documents to the State Department in Richmond, he forwarded them to Mr. Seward in Washington."

B. J. Hendrick, *Statesmen of the Lost Cause,* p. 137

Whether or not Riddell could be considered "a spy in the employ of the Federal Government" is open to question. We have no real evidence to substantiate this charge. Riddell was definitely a Union sympathizer, but was considered a conscientious and able worker in the Post Office until the occupation of New Orleans.

One telegram in the National Archives, on a blank of the Washington and New Orleans Telegraph Line, is of interest. There is no year indicated. Whether or not this pertains to the pre-Civil War period, or the actual Confederate period, is open to dispute. No accompanying papers bear any relation to the message.

"The following communication was received at Washington 20th 11 o'clock 0 min.p.m. dated New Orleans 20th 9 o'clock 20 min.p.m. for Hon. Jeff. Davis.

"Professor J.L.Riddell competent and responsible, will accept our mint treasuryship. Please telegraph me where it is too late to forward recommendations."

Geo. Dunlap
Message in National Archives,
Fiscal Section

If this means that Riddell was prepared to accept the mint treasuryship with the Confederate authorities, it is quite surprising, in view of Riddell's Union sympathies.

Riddell's successor as Postmaster of New Orleans took office February 19, 1863, John M. G. Parker. He had served as acting postmaster under appointment by Major General Benjamin F. Butler from May 2, 1862, until the regular Federal appointment was made.

XVIII. POLITICS – 1863-1865

The role played by Riddell during the latter part of the Civil War is not too clear. In spite of his position in the New Orleans Post Office, Riddell was an outspoken opponent of secession. Following the capture of New Orleans and during the military governorships of Generals Benjamin Franklin Butler and Nathaniel Prentiss Banks, he was a vocal Union sympathizer. He was associated with the Conservative Unionists, and with the Constitutional Union Party of Louisiana. This group was agitating as early as October, 1863, for a general election for Louisiana.

Riddell and his associates petitioned President Abraham Lincoln for permission to hold the regular election in Louisiana on November 2, 1863. In Riddell's own words,

"In 1863 I earnestly cooperated with a large number of conservative Union men with the object of loyalizing the entire states of Louisiana, Texas, Arkansas and Mississippi, and bringing them fairly and squarely into their old places in the Union . . . In June a deputation from the planters of Louisiana asked Mr. Lincoln to instruct the Military Governor of Louisiana to permit the recurring biennial election to be held November 2, 1863, under the State Laws. Mr. Lincoln declined to do so just then."

New Orleans *Times,*
October 21, 1864

Riddell and members of the Louisiana Congressional Delegation also visited President Lincoln, urging his cooperation, but their efforts failed because, as Riddell phrased it,

> "the abolitionists took over Congress."

In spite of Lincoln's refusal the group persisted and made plans to hold the election. Opposition elements also planned to have tickets in the election.

A group known as the Executive Central Committee of Louisiana, led by W. W. Pugh, E. Ames, and John Quincy Adams Fellows, met in New Orleans on October 26, 1863, and issued a proclamation to the citizens of Louisiana, urging them to vote in elections which would be held on November 2, 1863. The New Orleans *Times* came out editorially against the proposal, indicating that General Nathaniel P. Banks, Butler's successor, had not been consulted.

General Banks was indeed opposed. General George P. Shepley, then military governor, was also opposed and proceeded to prohibit the statewide election. The United States Treasury appointee in New Orleans, a Mr. Dennison, wrote:

> "Governor Shepley, by two or three firm but mild letters put a stop to the whole proceeding . . . the whole movement . . . was nothing but copperheadism and secessionism in disguise . . . and resolved itself into a ridiculous farce."
>
> Chase Correspondence, vol. 2, p. 423
> From W.M. Caskey, *Secession and Restoration of Louisiana,* 1938

However an election of sorts was held in certain parishes of the state. A quotation from the New York *Herald* appeared in the New Orleans *Times* for December 18, 1863:

> "We are reliably informed that an election was regularly held in Louisiana on the first Monday in November as the State laws directed, and that Mr. J. L. Riddell of New Orleans was elected Governor of the State, and Messrs. A. P. Field of New Orleans, Joshua Baker of St. Mary's Parish, and Thomas Cottman of Ascension Parish were elected representatives to Congress. . ."
>
> New Orleans *Times,* December 18, 1863

This was the first report of the results of the pseudo-election reaching New Orleans, and evoked much unfavorable comment in the press.

Field and Cottman presented themselves in Washington to be seated in Congress, with credentials signed by Riddell. The New Orleans *Times,* December 23, 1863, reports the proceedings under the heading

> "The Great Louisiana Farce — Certificate of 'I, John Leonard Riddell, Governor of the State of Louisiana.'"

The *Times* continued:

> "The Congressional *Daily Globe* . . . gives us fuller accounts than have yet been published here, of the broad and extraordinary farce which the so-called "Governor" and "Representatives" of Louisiana are just now acting in Washington, with unbounded applause from all quarters."

Quoting from the *Daily Globe,* December 8, 1863, the credentials referred to are as follows:

> "I, John Leonard Riddell, governor of the State of Louisiana, duly and legally elected by the voters of said state, in pursuance of the Constitution and laws of said state, do hereby certify that at an election begun and held in said State on the 2nd day of November, 1863, in accordance with the laws of said State, for the purpose of electing five representatives from said State to the 38th Congress of the United States the following named persons were regularly elected to represent said State in said Congress for the term of two years from the 4th of March, 1864, namely:
>
> From the 1st Congressional District—A. P. Field
>
> From the 2nd Congressional District—Thomas Cottman
>
> From the 5th Congressional District, comprised of the whole State of Louisiana, Joshua Baker.
>
> "All of whom were regularly elected in accordance with the Constitution and laws of said State of Louisiana.
>
> "In testimony whereof, I, John Leonard Riddell, Governor, elected as aforesaid and duly sworn, do hereby commission said persons so elected as aforesaid and duly sworn, to represent said State in the 38th Congress of the United States and do hereby give these credentials in evidence of their loyal and regular election as aforesaid: and I do hereby affix my name and private seal of office (the public seal thereof being forcibly kept in the possession of the public enemies of the State) on this 20th day of November in the year of our Lord 1863 and the 88th year

of the Independence of the United States of America."

John Leonard Riddell
Governor of the State of Louisiana

New Orleans *Times,*
December 23, 1863

In the discussion which followed the reading of this document in the House of Representatives, Representative Stevens of Pennsylvania referred to Riddell as a

"man whom nobody in the United States ever heard of as governor."

After much discussion the credentials of Field and Cottman were referred to a Committee, and at a later date they were refused their seats.

The New Orleans *Times* ridiculed Riddell, and hinted that he had not

"taken the oath in the President's last proclamation."

This refers to the loyalty oath.

In 1864, Riddell served as president of the Union Association, organized with the approval of the military. In a speech delivered before the "Democratic and Conservative Mass Meeting" held in New Orleans, October 13, 1864, Riddell reviewed the early War years:

"In critical times or great emergencies requiring a course of action to be wisely decided upon, it often appears that there is advantage to be gained from simply keeping cool, and carefully thinking over the matter a second time. These were critical times for the South; but the South, especially South Carolina, did not keep cool, did not think the matter over a second time. The reckless politicians and place holders in the South madly rushed into rebellion and open warfare. They induced and ultimately forced the people to go with them; although in several of the states, Louisiana for instance, it is certain that a large majority of planters and citizens, entitled to vote, were disposed to loyalty, union and peace. In this instance it is said the thing was arranged by a fraudulent appeal to the ballot box and that the detailed result of the voting was never published.

"Mr. Lincoln had been legally and duly elected President of the United States; Mr. Lincoln should have been accepted as such by all the States and all the people. In my humble opinion—fearlessly and publicly and frequently expressed then, while the propriety of secession was being discussed, and continuously held until now—the South were insane not to accept him and try him. I remember there was some such prejudice against Mr. Fillmore but he made as excellent president. Who can say that Mr. Lincoln having attained the summit of his ambition would not have given satisfaction even to the South, if we had contrived to keep our delegations in Congress and given him a peaceable chance?"

New Orleans *Times,*
October 21, 1864

The thoughts expressed by Riddell were, to say the least, unpopular.

Riddell was considered a leader of the "conservative" group of Unionists and led that delegation to the Chicago convention of the Democratic Party in 1864. The delegation, which was not seated, asked to be "united with the Northern democracy." The group was definitely anti-Lincoln and pro-McClellan in the 1864 presidential race, using the slogan "McClellan and Moderation."

Another paragraph from the October 13, 1864, speech, which was published in its entirety by the New Orleans *Times,* reads:

"I find no fault with the professed basis on which the United States government prosecuted the first year's war — the preservation of the Union and Constitution and the enforcement of the laws . . . I rather think the large confederate armies will be conquered and dispersed by the Union forces; but this result will not bring lasting peace, or accustomed prosperity to the Southern country."

New Orleans, *Times,*
Oct. 21, 1864

In a state still divided between Union and Confederate forces, where the local citizenry had relatives and friends in the Confederate armies, such remarks did not endear Riddell to the community. If the tone of all of his discussions and remarks since 1861 were of that sort, it is a miracle that some hot-headed citizen did not eliminate him from the local scene.

Newspaper comment on Riddell's speech was favorable. The *Times* noted:

"Governor Riddell was next introduced and he made a most amusing speech."

New Orleans, *Times,*
October 14, 1864

The *Daily Picayune* reported:

"John Leonard Riddell, Esq. was then introduced and kept his audience in a roar of

> laughter at his wit and dry hits at the administration party."
>
> New Orleans *Daily Picyaune,*
> October 14, 1864

However Riddell's prestige further diminished when Lincoln was re-elected.

About this time there was evidence of failing health. In the Riddell obituary we note

> ". . . he had experienced slight attacks of paralytic affection, which were monitory to himself, his family and his friends, of the danger he was in of ultimate more serious and most probably, final fatal ones. This led him to be generally careful to avoid decidedly exciting causes, but, perhaps, neither so constantly nor so particularly as he might. He still pursued his scientific inquiries, still scrupulously attended to his multitudinous private business affairs, still took an active share in public matters, still occasionally filled public offices, still mingled with the world, and partook of its pleasures, though not given to excesses."
>
> *The Daily Southern Star,*
> New Orleans, Louisiana, October 8, 1865

At the close of hostilities Riddell was one of the citizens receiving presidential pardons. In the archives of the Howard-Tilton Memorial Library, Tulane University, there is a photostat of his pardon, reading, in part:

> "Full pardon and amnesty from President Andrew Johnson for all offences by him committed arising from participation direct or implied in the said Rebellion. . ."

It is dated August 14, 1865. The proclamation indicated that Riddell must take the oath prescribed, as stated in the presidential order of May 29, 1865. The pardon was announced in the *Tagliche Deutsche Zeitung* of New Orleans on November 12, 1865. Whether or not Riddell knew of the pardon before his death on October 7, 1865, is not known.

Dr. Riddell was the presiding officer at the Louisiana State Democratic Convention, held at the Mechanics Hall, New Orleans, October 2, 1865. After a brief word of welcome, Riddell gave what turned out to be a sensational speech, in which he stated:

> "Whatever may have been thought of the policy of secession, all are now prepared to admit that the secession of Louisiana was worse than a crime – it was a blunder.
>
> "The principal cause of the war was the negro. Certain members of the radical faction are trying to foist him on us as a citizen. The negro has never reached the status of the Caucasian . . . I am not willing to meet him as an equal, socially, or at the ballot-box."
>
> New Orleans *Daily Picayune,*
> October 3, 1865

At the evening session of the Convention Riddell "was allowed to explain his position." A member of the Convention presented a resolution to the effect that Riddell's remarks

> "attempted to rekindle the antagonisms of a former period by characterizing the acts of the State of Louisiana as criminal and treasonable, thereby presuming to cast a stigma and a censure upon many if not all the members of this Convention. . ."
>
> New Orleans *Daily Picayune,*
> October 3, 1865

The resolution proclaimed that the Convention was not responsible for Riddell's remarks. When Riddell promised to explain his position in the public press the resolution was withdrawn. Riddell's speech had offended the citizens, to say the least, and

> "touched a sensitive chord in the moral and political structure of the assembly and it was consequently assailed as false in morality, and, as far as politics were concerned, as ill timed and indiscreet."
>
> New Orleans *Times,*
> October 8, 1865

Another article quoted Riddell:

> ". .,. (he) felt sure that all of those present now recognized the act of secession as a crime involving as it had, bloodshed and treason."
>
> New Orleans *Times,*
> October 3, 1865

He was assailed by the audience, and stopped by protests and boos on that memorable October 2, 1865.

> "It need not be disguised that notwithstanding the position in which Dr. Riddell stood before the Convention as the Chairman of the National Democratic State Executive Committee, and in that capacity calling the Convention to order, his political antecedents and his political relations with a large portion of the Convention were not such as accorded with a very strong feeling which prevailed. Nor can there be much doubt that this was the real source from which sprang a very severe attack upon him for making use of the

very common phrase above referred to. The harshness and plausibility of the attack upon him for this, affected him very much, especially when he found that even his explanation, that he intended nothing like what the phrase had been construed to mean, was not received as sufficient to satisfy those who had taken offence in it."

The Daily Southern Star,
New Orleans, October 8, 1865

Riddell indicated that he would prepare an explanation, and went to the office of the *Daily Southern Star* to write it.

"We saw nothing of him till late in the evening, after this occurrence, but we are informed that he had in the meantime continued much excited. About 8 o'clock in the evening he went home, but finding that a note had been left at his house by a gentleman connected with this office, he came hither to inquire what that gentleman desired to see him about. He spoke to one of the gentlemen in the editorial room, apparently quite calm, and in his usual health – free, in fact, from excitement of any kind. He was introduced into the private room of the proprietor (Edwin L. Jewell), and after a brief conversation with that gentleman, in which he manifested the same collectedness, he commenced writing an explanatory card upon the subject of his misinterpreted remark. While he was doing this, the editor having business to attend to, Dr. Riddell was left alone in the office; presently the noise of a heavy rattling fall was heard, but attracted no attention, as it was supposed to be that of some heavy material about the office, and it was not for some two or three minutes afterwards that the editor, passing the door of the office, saw, to his alarm, that Dr. Riddell had fallen to the ground and lay extended on his back apparently dying. He immediately called for assistance, which was on the spot, and such as the case allowed of was promptly given. In the course of half an hour Dr. Riddell had sufficiently revived to warrant his being put into a chair, although he could not sit there without support.

"He had been seized with an attack of apoplexy, attended, as is frequently the case, with partial paralysis. He could not be understood, although he endeavored to answer every question put to him; but his mind was wandering, incoherent, and deranged. He gradually improved so far that his removal to his residence was judged proper, and he got there shortly after 10 o'clock. There he continued to improve to the extent of apparently overcoming the muscular paralysis, and spoke clearly and in cases rationally and to the point, although up to the time he was left in the hands of his family physician, his mind was so unsettled that he was not aware he was at home, and knew nothing of having been at this office. We have heard it stated that he was out the following day, but think there is some misapprehension on this point. At all events, he subsequently relapzed, and although the first medical aid in the city was afforded him – Dr. Stone being called in consultation – he gradually sank till he departed this life, as we have stated.

"On examining the paper on which Dr. Riddell had commenced writing, in the office of the editor of this paper, it was found to contain nothing but unintelligible incoherencies and repetitions. . ."

The Daily *Southern Star,*
New Orleans, Louisiana,
October 8, 1865

Riddell's death occurred at 8:20 a.m. on October 7, 1865.

The obituary notice in the *Daily Southern Star,* as given above, was the most elaborate and detailed account of his last hours. Other obituaries were shorter and more general. The obituary in the New Orleans *Times* reflected the bitterness of the citizens, but acknowledged that

"his intellect was searching, analytic and vigorous, and his scientific attainments were of a very high order . . . Indeed he had a passion for scientific inquiry, and his liberality in that regard was in marked contrast with his ordinary economic habits.

"In chemistry he was especially well versed, and as professor of that science in the University of Louisiana he was regarded as a shining light. His labors and researches in microscopic observations and descriptions, in the various fields of the literature and science, have been highly appreciated both in Europe and America."

New Orleans *Times*,
October 8, 1865

The New Orleans *Daily Picayune* commented editorially on Riddell's death. The editor considered Riddell's convention remarks inoffensive, and, after a brief biographical sketch, concluded:

"A man of large brain, of great industry, patience and equanimity, he acquired a vast fund of scientific knowledge, and what is more remarkable, combining with these qualities great tact, thrift and management in the practical affairs of life, he accumulated a large fortune. . ."

New Orleans *Daily Picayune,*
October 8, 1865

Another account, written by Dr. John T. Scott for the *New Orleans Medical and Surgical Journal,* noted that Riddell had given evidence

> "that the silver cord was loosening, and the golden bowl about to be broken. . ."
>
> *New Orleans Medical and Surgical Journal,* 1866, vol. 19, pp. 284-287

indicating that his mind was definitely failing at the time of his death. His true condition is not known, but evidence establishes that he was greatly agitated about political subjects. Dr. Scott cites Riddell as a practical benefactor of mankind, and notes his many acts of kindness and philanthropy, and his strong vitality.

Rufus Waples and Dr. James S. Knapp prepared the customary obituary notice and resolutions for the New Orleans Academy of Sciences. This includes a very meager sketch of his life, and the following paragraphs:

> "As a lecturer on Chemistry in the University of Louisiana he was remarkable for perspicuity of style and diction. He enjoyed the highest esteem of the students among whom he was extremely popular. Unlike many men of learning, his attainments formed no barrier to a personal approach by the unlettered; nor did they prevent him from kindly and constantly aiding others, nor from giving that attention to business affairs in which he was eminently successful and by which he accumulated and left to his family a large and productive property.
>
> "In the New Orleans Academy of Sciences of which he was one of the founders, he acted most efficiently as President nearly all of the time from its formation. Among the varied subjects under discussion his uncommonly retentive memory, his accurate and general information and his happy faculty for imparting knowledge enabled him to cast light on almost any subject under consideration. Their thanks are especially due to him for the preservation of the domicile of the Academy from pillage and waste during the perilous times of Civil War."
>
> *New Orleans Academy of Sciences* November, 1865

The New Orleans Academy of Sciences then adopted formal resolutions, which were published in the *Daily Picayune* on November 10, 1865:

> "There was a meeting of the Academy of Sciences on Monday evening at which the principal business done was the receiving and adopting of the report and resolutions of a committee on the death of Dr. Riddell, formerly president of the Academy.
>
> "Resolved: 1. That in the death of Dr. Riddell every department of the natural and exact sciences has suffered loss; for he excelled in each and won an enviable reputation both in Europe and America, for his varied scientific attainments, and his highly valuable contribution to the useful arts.
>
> 2. That we, his fellows, not only bear testimony to his wonderful mental endowments, his analytical powers and his unusually retentive memory, but also to his goodness of heart, his urbanity of manners, his placidity of temper and his admirable qualities in all the relations of life.
>
> 3. That as a society we lament in him the loss of a father who, ever devoted to the advancement of science cooperated with such men as Hale, Barton and Benedict in founding this Academy. Its President nearly ever since its foundation, his zeal, industry and eminent attainments have contributed very much to make and sustain its character among the learned bodies of the civilized world.
>
> 4. That we tender to his bereaved widow and children and to our fellow members Dr. S. S. Riddell his son, and to Prof. W. P. Riddell, his brother, our heartfelt sympathy and condolence, feeling that our intimate relations with the deceased enable us, in some degree, to appreciate the deeper grief which Heaven has visited upon them.
>
> 5. That we will wear the usual badge of mourning for thirty days.
>
> 6. That a copy of these resolutions be presented to the family of the deceased and that the foregoing outline of his life be published, with these resolutions, in such newspapers of the city as will give them insertion."
>
> Respectfully submitted,
> Rufus Waples
> Jas. K. Knapp
> Committee
>
> J. S. Copes
> vice-president

Funeral services were held from Dr. Riddell's home, #12 Dryades Street, on October 8, 1865. Burial was in the Riddell family tomb in the Protestant (Girod Street) Cemetery. The tomb here referred to is a different one than mentioned earlier. At some time during the 1850's Riddell had constructed a large granite tomb, and in it were buried Dr. Josiah Hale and Riddell's son Gaen Leonard. In this tomb were eventually

Figure 17. Riddell's original tomb in the Protestant (Girod Street) Cemetery, New Orleans, Louisiana (photograph by the author).

Figure 18. Riddell's final resting place, Metairie Cemetery, New Orleans, Louisiana (photograph by the author).

placed his widow, Mrs. Angelica Brown Riddell, and Mary Riddell Hogsett, and Lephe Riddell Woodward. Prior to the demolition of the Protestant Cemetery the contents of this tomb were removed to a plot in the Metairie Cemetery. There is an appropriate granite headstone, with the names of Riddell, his wife and daughters.

At the time of his death Riddell was a man of considerable wealth. There was extensive litigation concerning his succession, with the son Dr. Sanford Schrager Riddell demanding his proper share. Since Riddell died without making a will and since the seven surviving children by the last marriage were minors, tutors and guardians were appointed. Careful inventories were prepared and kept of all receipts and disbursements, even to the smallest item. The total value of the estate was $152,916.53, which included real estate appraised at $120,000. According to the Louisiana Civil Code, 2359th Article, in effect at that time,

> "... the said Mistress Angelica E. Riddell is entitled to receive in the said succession only a child's share in usufruct, and has therefore to receive in usufruct only 1/9 of the whole property of the said succession..."
>
> Notarial Archive #38026
> New Orleans, Louisiana

Apparently Sanford and the rest of the family did not agree, for he pressed his case for partition of the estate and division of the property. He won his case in court.

Peter and Susan (then Mrs. A. P. House) also appealed the succession March 24, 1879, after Peter had come of age.

In the 1867 inventory there are thirteen lots of property in Orleans Parish, Louisiana, listed, as well as mention of holdings in Jefferson Parish, Louisiana. Riddell was also the holder of notes amounting to $17,533.34. A Sheriff's Sale, conducted by Harry T. Hays, Sheriff, of notes, stocks, due bills, coins, scrips of insurance, etc. was held on May 11, 1867, as part of the action to settle the estate.

– – – – –

John Leonard Riddell – scientist, educator, politican, business man and devoted family man – a New England Yankee transformed into a New Orleanian – will be remembered as an innovator and leader in his field by the historians of science.

XIX APPENDIX:

The Riddell Mint Correspondence

The following letters are part of the United States National Archives, Washington, D.C. in the General Records of the Department of the Treasury, Record Group 56, and in the Records of the Bureau of the Mint, Record Group 104. The letters have been placed in a reasonable order, and have retained the original spelling, phraseology and punctuation as far as possible to determine from the originals and from microfilm. There are a few obvious errors in grammar and spelling, but these have not been corrected.

Letter #1

R. M. Patterson, Director of the United States Mint, to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana. May 28, 1840.

Dear Sir,

I received letters yesterday from Peter I. Levick and Ewald Ernst, complaining of the circumstances under which they had been discharged from your Mint, and the latter making accusations of a very grave character, against Dr. Riddell. The same accusations had come to my ear before, indirectly, through a correspondent of one of our workmen, but I felt assured that it must be without foundation, as I had just received a letter from you that was utterly incompatible with the existence of any such offence as that averred. The accusation, as you know, is that Dr. Riddell has employed a hand or hands at certain wages to be paid by the government, but with a private bargain that a part of the wages was to be given up – the first story said for the private gain of Dr. Riddell, the second for the benefit of a Dr. McCarthy, employed in the establishment. The inference which I draw from Ernst's letter is that he had made the accusation in question – that you enquired into it and found it false – and that you immediately dismissed him as a slanderer. You will excuse me, however, for asking you for the exact truth in this matter, inasmuch as the affair has been already forced upon my attention.

It is proper to state that the letter of Mr. Levick is perfectly respectful to Dr. Riddell, against whom he makes no accusation or complaint; except that he dismissed him without cause. Levick has respectable connections here, and says that he writes only for the purpose of removing the unfavorable impressions which his discharge might

make against his character.

Very respectfully,
Your faithful servant,
R. M. Patterson

Letter #2

R. M. Patterson, Director of the United States Mint, to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana. June 13, 1840.

Sir,

From editorial notices in the N.O. Sun of the 30th and 31st ult. and other such sources I am pained to hear of evil reports and suspicions, and investigations, regarding the Melter and Refiner of your Mint. I pray you to let me hear from yourself – the only legitimate source to which I can look for information – the truth as to a matter in which I have so deep an official interest.

Very respectfully,
Your faithful friend,
R. M. Patterson

P.S. In connection with this subject it may be proper to mention that I received, a few days ago, a letter from Dr. John McCarthy, who, it seems, was employed in Dr. Riddell's department, and who makes a bitter attack upon that officer. As it appeared however, that McCarthy was himself under suspicion and was greatly irritated by this circumstance, and as you must necessarily have been acquainted with the whole affair, I did not think my interference in the case called for.

Letter #3

John Leonard Riddell to Hon. Levi Woodbury, Secretary of the Treasury, June 13, 1840.

Sir,

That injustice may not be done to myself I feel it incumbent on me to address you at this time.

For some weeks past no gold has been coined in this mint. The last three melts of gold ingots have been cracked in the coining department in rolling: – and yet by proper annealing I found no difficulty myself in rolling successfully samples from each melt. Knowing and being now able to establish that the ingots have all been of good quality, I have made a written request through our Superintendent, to be permitted to use for an hour the annealing furnace and gold rollers in the coining department, that I may so far prepare the gold for ingots of the next melt, by partial rolling before delivery to the coiner, as to preclude the possibility of their being cracked in subsequent operations, pledging myself to send you my resignation, if I fail in rolling the ingots well. The coiner declines my request.

The matter in its commencement was submitted to Dr. Patterson, whose reply we wait, and whose decision, I hope will remove all difficulties.

I should have been loath to trouble you thus, were I not well assured that secret efforts are being made to prejudice my standing with the Government. The inclosed certificate with the remarks preceding it, cut from one of our city papers, will give you an idea of some of the groundless measures taken against me. Conscious that I have well and faithfully performed my duties, I have but this single request to make: – that if complaints seemingly worthy of your attention, be proffered against me, I may not be condemned unheard, nor without due inquiry. Pardon me for adding that my time for twelve years past has been almost exclusively devoted to chemistry and the natural sciences. In 1836 I was employed to make a geological reconnoissance of Ohio. For a while I held a professorship in the Cincinnati Medical College, and for four years past have been professor of Chemistry in the Medical College of Louisiana. For my standing and ability I can, among many, call the following men to vouch: My old preceptor, Prof. Amos Eaton, Troy, New York; Prof. B. Silliman, New Haven; Prof. John Torrey, New York; Prof. J. B. Rogers and Prof. Aiken, Baltimore; Dr. S. G. Morton, Philadelphia; Dr. S. P. Hildreth, Marietta, Ohio; Dr. Daniel Drake and Prof. C. W. Short, Louisville, Ky. with most of whom I now maintain a correspondence.

Very respectfully,
Your obedient servant
J. L. Riddell
Melter & Refiner

Notation in pencil, not too legible, apparently by Secretary Woodbury. Definitely not Riddell's handwriting.

Actg. supt – Before its arrival – The agts in the complaints made against you had ordered a statement of the complaints against you transmitted for your explanation. They are as follows:

. . . offer to you to inquire is denied . . . a copy of your letter will be sent this day to the Director and his immediate attention invited to the subject.

LW

Write accordingly to the director giving him . . . called on Doct R for explanation of the charges.

LW

R387, June 24
NOrleans

Printed statement, from a New Orleans newspaper, attached:

Communicated

Two editorial communications have appeared in the Sun, casting suspicions on the integrity of the melter and refiner in the mint, and promising that an investigation about to be instituted, will soon be made known. The higher officers in the mint have never entertained or express the least doubt of the integrity of the melter and refiner, and the only

investigation proposed was volunteered by himself, to silence the false reports raised by the misrepresentations of an individual who was lately in his employ as a laborer. Here is a copy of the Treasurer's report:

Treasurer's Office, United States Branch Mint
New Orleans, May 31, 1840

Be it known, that I have this day, at the request of Dr. J. L. Riddell, smelter and refiner of this mint (and in the presence of J. M. Kennedy, Esq. Superintendent) examined the contents of his vaults, I have weighed the bullion as far as it is susceptible of being weighed, and have estimated the balance, and am satisfied that the amount of gold and silver bullion in the possession of Dr. Riddell, is fully equal to that called for by the books of my office.

H. C. Cammack
Treasurer, U.S. Branch Mint

Letter #4

R. M. Patterson, Director of the United States Mint, to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana. June 46, 1840.

Sir,

I have received New Orleans papers today, of the 1st and 2nd inst., sent, I presume, from your Mint, and containing Mr. Cammack's certificates regarding Dr. Riddell's account as Melter and Refiner. This is well. But I am also informed, indirectly, through the correspondence of a gentleman not connected with the Mint, of an outrage subsequently committed, and in which Dr. Riddell and one of your workman – Nixon – were parties. The story, as related, is that one of Dr. Riddell's men – McCarthy – having taken offense at his principal, had made complaints which gave rise to the investigation into Dr. Riddell's affairs; and, that, in revenge for this conduct, Dr. Riddell, accompanied by his brother and Nixon, armed with clubs, and daggers or Bowie knives, had gone to McCarthy's chamber, and beaten him severely. The end of the story is that Dr. Riddell, and his brother, and Mr. Nixon, had been turned over to the Criminal Court for this assault, and that the operations of the Mint were suspended.

I hope that this shocking report is not true, or at least that it is exaggerated. It can hardly be possible that I should not have your representations of the matter, before this letter reaches you; but, in any event, I am most anxious to hear the truth, and to hear it from you. It is a case that deeply concerns you, for it involves the reputation of an institution under your immediate charge. The practice of a resort to brute force in support of private character must be considered by all moralists as equally wicked and absurd; what terms then can be used, when the same resort is made for the support of public character, and is applied to a subaltern? I know not code can justify it.

Very respectfully,

Your faithful servant,
R. M. Patterson
Director

Letter #5

Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana to R. M. Patterson, Director of the United States Mint, Philadelphia, Pennsylvania. June 6, 1840.

Sir,

I have received from Mr. Cammack, a note, a copy of which I now enclose, together with the letter for you, mentioned therein. In my last of the 2'd inst, accompanying our statement for May, I observed that I would in a short time communicate to you the cause why no gold had been coined for some time at this Mint, and other information in relation to our affiars.

With regard to gold coinage, the matter stands as stated by Mr. Commack. "Several melts have been made of gold, which have been returned uncoined," the ingots having, on every occasion proved too brittle. But there is a difference of opinion between the Melter and Coiner, concerning the cause of that brittleness, each contending that it originates in the Department of the other. Dr. Riddell is persuaded that his ingots are good. He says that they are annealed by Mr. Tyler at too high a temperature, (all that is required being "a dull red heat,") and that being then immersed in the pickle, and suddenly cooled, they are consequently brittle.

The Coiner, on the contrary, maintains that they are not well toughened, and that they should be so made by the Melter, as not to be affected in the cooling by any heat that is not beyond the "cherry red," which he says is several degrees higher than that insisted upon by the Melter.

I am myself unable to determine between them, and am convinced that you are the only person to whom I can appeal, that would (in coming to a decision yourself, or in furnishing me with such information as would enable me to do so), give satisfaction to both parties. I could send you an ingot selected indiscriminately by me, from the number returned to the Melter as unfit to be coined, whereby you could settle the question very soon.

An occurrence has recently taken place between Dr. Riddell, and a person of the name of McCarthy, who was employed in his department; which I think it my duty to lay before you, as it may before its consequences are over, interfere with our operations.

McCarthy had a quarrel a few days ago with Dr. R. and left the Mint. A report, of which he was the author, that the Melter was a dishonest man, and would prove himself a defaulter if called upon to settle his accounts, soon reached the ears of his securities. They applied to me for information, and desired that I would suggest what course they should pursue. I advised them to call on Dr. Riddell, to communicate to him what they had heard,

and to state that in justice to himself as well as them, he should, without delay, throw open his vaults to the Treasurer, in order that he might examine whether their contents correspond with the amount with which he was charged. Dr. Riddell made not the slightest objection, and you will find the result in a certificate herewith enclosed, issued by the Treasurer on the day on which the examination was made, and which was inserted in those newspapers in which the report above-mentioned had been previously noticed.

On the day succeeding, Dr. Riddell went to the lodgings of McCarthy and whipped him severely. He was accompanied by his brother, who is the foreman of his department, and a Mr. Nixon, one of his men. He took them with him, he says, merely to prove that he was without any kind of weapon. The three were shortly after brought before an officer of Justice, who, upon hearing the evidence, committed them all for trial before the Criminal Court.

The punishment for assault and battery is fine, or imprisonment, or both at the discretion of the Court. In case of the conviction of either of the workmen, their places may easily be supplied, but what are we to do if the Melter and Refiner should be sentenced to such imprisonment as would materially interrupt the operations of the Mint? I will apprise you immediately of the result of the trial.

I am, sir, very respectfully,
Your obdt. servant,
Jos. M. Kennedy,
Supt.

Copy of Treasurer's Certificate, referred to in J. M. Kennedy's letter to R. M. Patterson.

(From the *New Orleans Sun* of June 2, 1840)

Treasurer's Office,
U.S. Branch Mint
New Orleans, May 31, 1840

Be it known that I have this day, at the request of Dr. J. L. Riddell, Melter and Refiner of this Mint, (and in the presence of J. M. Kennedy, Esq. Superintendent), examined the contents of his vaults; I have weighed the bullion as far as it is susceptible of being weighed, and have estimated the balance, and am satisfied that the amount of gold and silver bullion in the possession of Dr. Riddell, is fully equal to that called for by the books of my office.

H. C. Cammack
Treas. U.S. Br. Mint

Note from H. C. Cammack to R. M. Patterson: June 3, 1840.

Sir,

. . . The silver coinage during the past month was larger than ever before made in one month in this Mint. With a good supply of bullion we could get on more rapidly than I had imagined possible. The Coiner struck on the 30th all 40,500 half-dollars in one press.

In gold we have done nothing for a long time. The same difficulty now arises about gold ingots, that created so much trouble last month about silver ingots. Several melts have been made of gold which have been returned uncoined.

I will here remark to you candidly, and I do it with reluctance, that the Melting and Refining department, in its operations, has not reached the anticipations I had entertained, in consequence of the recommendations so warmly made by the friends of Dr. Riddell — nor has he succeeded in preserving in the Mint, that harmony and good feeling, so much to be desired, and without which the operations of the Mint must be retarded, and the situation of other officers rendered unpleasant. As it was I who first brought Dr. Riddell's name before you, for nomination, which I did without knowing him, and without his knowledge, I deem it incumbent on me to apprize you of my disappointment. . .

I am, with considerations of
respect and esteem,
Your faithful servant,
H. C. Cammack

Note from H. C. Cammack to Joseph M. Kennedy, undated.

My dear Sir,

Enclosed I hand you a letter for Dr. Patterson, and if you think it not objectionable, please to forward it to him.

My remarks about Dr. Riddell are drawn from me only by a sense of justice due, as I believe to Dr. Patterson and to myself. Having the first recommended him for appointment, I conceive that I am obligated to communicate any disappointment which I have met with subsequent to the nomination.

As I am activated only by a sense of duty, I trust that there will be no action on what I have written, and for that reason I suggest to you the propriety of my letter being considered private. I do this with more propriety as you have intimated to me your intention of reporting to Dr. Patterson on this subject.

Believe me, very Sincerely,
Cammack

Letter #6

R. M. Patterson, Director of the United States Mint, to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana, June 18, 1840.

Sir,

I hasten to acknowledge the receipt of your letter of the 6th inst. giving me information, in an authentic form, which my late correspondence will have shown you that I was seeking with great anxiety. I do not hesitate to say that I most heartily disapprove of Dr. Riddell's conduct in the affair of Dr. McCarthy, and I shall deem it my duty to represent it to the government It is for the Presi-

dent to determine what course to take in the case, and it is possible that it may not lead to the removal of the officer in question, but if it should, it will be of the greatest importance that no time should be lost in finding a successor, and I deem it right, therefore, to ask you to tell me, in confidence, if you know of any individual competent to fill the station. A practical acquaintance with the business is not to be expected but an acquaintance with Chemistry is. I should think that any gentleman who has had a good medical education might soon acquire the practical knowledge necessary. Our present Melter and Refiner has had no other ground to build upon, and he became in a short time, a competent and effective officer. I consider it of great importance that all persons to be attached to your Mint should be acclimated to New Orleans, and this must, of course, be looked to, if a new appointment is to be made.

I am assured both by our old and by our present Coiner, that there is no difficulty whatever in the annealing of gold. There is not the same inconvenience from overheating, which occurs in silver. If the gold ingots to which you refer could not be rolled without cracking, the fault must have been in the preparation of the metal by the Melter, and not in the annealing by the Coiner. I should deem it quite unnecessary to send a specimen ingot here; but, if the parties desire it, I do not object to this course.

Very respectfully,
Your faithful servant,
R. M. Patterson,
Director

Letter #7

R. M. Patterson, Director of the United States Mint, to Hon. Levi Woodbury, Secretary of the Treasury, June 19, 1840.

Sir,

I feel it my duty to send you the enclosed copies of a correspondence regarding Dr. J. L. Riddell, the present Melter and Refiner of the Branch Mint at New Orleans. You will see from it that my own information is as yet imperfect, yet it is sufficient to convince me that the choice of Dr. Riddell was an unfortunate one, notwithstanding his character as a scientific man and the strong recommendations in his favor. He has quarrelled with and discharged his workmen, he has lost the regard of his fellow officers and he is giving bad ingots to the Coiner, and does not seem able to make them better. Lastly comes the affair with one of his dismissed hands – McCarthy – which has brought disgrace upon the Mint, and exposed him, and two of his men whom he led with him, to a criminal trial.

You will, I presume, judge it proper to lay this matter before the President.

Very respectfully,
your faithful servant,
R. M. Patterson
Director

Letter #8

R. M. Patterson, Director of the United States Mint, to Hon. Levi Woodbury, Secretary of the Treasury, June 20, 1840.

Sir,

Having sent to you yesterday copies of a correspondence respecting Dr. Riddell of the New Orleans Mint, it may be right to mention that I have just received from him a long letter dated the 8th inst. All of it, however, which has regard to his affair with McCarthy is comprised in the following paragraphs:

> "In conclusion I must allude to a subject rather unpleasant. Contrary to the dictates of my better judgment, but from notions of charity, near the 1st of April I admitted to a laborer's station and pay in my department, Dr. John McCarthy—bred an apothecary in Cork, Ireland, more recently a student in our Medical College. He became greatly dissatisfied because I did not find him worthy of promotion. For a few days he took upon himself to promulgate the most slanderous falsehoods in relation to my official doings. He said he wrote a letter to you on the subject. As the slander or libel mite undergo a legal investigation I have to request that you will transmit to myself, or Mr. Kennedy if you prefer it, the original letter, as a copy will not answer."

I have deemed it proper to add this paragraph to the correspondence sent to you, though it does not perhaps give any additional light upon the case, and is certainly more remarkable for what it suppresses than for what it relates.

Very respectfully,
Your faithful Servant,
R. M. Patterson
Director

Letter #9

R. M. Patterson, Director of the United States Mint, to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana. June 27, 1840.

Sir,

I have to acknowledge the receipt of your letter of the 15th inst. explaining the circumstances of Ernst's discharge. It is a satisfaction to find that they correspond exactly with what I had supposed to be the true story, and had so stated in my letter making the inquiry. In fact, I never doubted the propriety of Ernst's dismissal. I have had some doubts as to Levick, but I suppose your promised letter will remove them. Had not his discharge some connection with a desire to make room for Dr. Riddell's brother, and has it not also been the immediate cause of the defect in the gold ingots?

I have received from the Secretary of the Treasury a copy of a letter to him, of the 13th

inst., from Dr. Riddell, on the subject of these gold ingots. It is a most extraordinary thing that a doubt should exist as to the fact whether these ingots are sufficiently ductile for the operations of the coiner. We cannot understand, here, how a dispute can exist over so plain a matter. It may be possible to roll some ingots, and yet they may not be possessed of that degree of ductility which may be fairly required by the coiner. If they are defective, I think it very improbable, as I have already told you, that the defect arises from the annealing; while, on the other hand, it is by no means an easy matter to make ductile alloys of gold. The process followed by us was explained in a communication formerly sent to your mint, and which has I presume come into the hands of Dr. Riddell, but I will give you a general view of it, as my doing so may enable you to form a better judgment as to the merits of this dispute.

You have gold, either fine or of high quality, and which may be perfectly ductile, and you are to bring it down to standard by adding copper. Now it is a general rule that this cannot be done directly, without making a brittle mass. You have, therefore, to prepare an alloy — called toughened gold — made by adding to gold an excess of copper, and then melting it down with successive doses of nitre, so as to remove portions of the copper and other oxidizable metals, and produce a mass which will vary in firmness, but which is best at about 700 to 750. This alloy is hard and rings like bell-metal — the ringing being the test of goodness used at the mint. The toughening is then assayed, and the proper proportion melted down with the fine gold, to make the standard metal required.

Now if Dr. Riddell has simply failed in making ductile standard ingots there ought not, considering his want of experience, to be any great astonishment expressed, or any great blame attached to him. The difficulty could have been removed by greater care, or, if the true process was not known to him, by asking information from this mint. I would not, for a moment, think of impeaching an officer, placed in the circumstances of Dr. Riddell, on such a complaint as this. But, if the ingots are really unfit for the coiner and Dr. Riddell refuses to change them, and insists that the coiner is not competent to judge of them, then he must bear the blame. Surely you can judge of this matter. If, however, you have a difficulty to do so, the best way to settle this point may be to send an ingot to us that has been refused by the Coiner and approved by the Melter.

In my view of Dr. Riddell's case, the worst feature in it is the outrage committed on MacCarthy. I deemed it my duty to present the case to the government, and, in doing so, also mentioned the charges as to the ingots, on which, however, I do not lay great force unless it may be shown that the ingots being bad, he has refused to amend them.

I have no objection to your showing this letter to Dr. Riddell.

Very respectfully,
Your faithful servant,
R. M. Patterson
Director

Letter #10

John Leonard Riddell to President Martin VanBuren, June 18, 1840.

To his Excellency Martin VanBuren,

Sir,

I have been informed that some complaints have been laid before you, having reference to my standing as melter and refiner in this mint — the office you were pleased to confer upon me some eight months since. I hear that great stress is laid upon the circumstances and possible consequences of an assault committed, with the open hand upon a person who had recently been employed in the mint, though at the time, no way connected with it.

What I did, I was advised to do by the officers of the mint, Messrs. Kennedy and Cammack; and by them and others my conduct was afterwards warmly approved. It is true, I have been convicted of an assault and battery, but as a civil action is pending relative to the same matter, no sentence will be given for a year or two, until the latter be first decided. The Judge in the Criminal Court assures me that mitigating testimony relating to the slander and libel which caused the assault will be admitted and that the punishment shall be pecuniary, rather than in the way of imprisonment.

Conscious of having faithfully done my duty, *my brief request is that I be not sacrificed without a fair hearing nor without due inquiry.*

I should be sorry to suffer wrongly in your estimation—*at the instance too of some who are unfriendly to your reelection.*

Respectfully your
most obedient
and humble servant
J. L. Riddell

Notation: File with the complaint – W
(Probably Levi Woodbury).

Letter #11

Hon. Levi Woodbury, Secretary of the Treasury, to John Leonard Riddell. June 24, 1840.

Notation: Branch Mint at New Orleans to which I invite your attention.

Dr. Riddell has been called on by the Department for explanation of the charges in the former communications.

Very respectfully,
L W Secy of Try

Sir,

Before the receipt of your communication dated the 13th inst. the President had directed a statement of the charges made against you to be

transmitted to you for your explanation. They are as follows, viz:

1. That you have unnecessarily quarrelled with and discharged your workmen – that you have lost the regard of your fellow officers and that you have not succeeded in preserving in the Mint the harmony and good feelings so much to be desired and without which the operations of the Mint must be retarded and the situation of the other officers rendered unpleasant.
2. That you have given bad ingots to the Coiner and do not seem able to make them better.
3. That the day after the examination of the contents of your Vault by the Treasurer, you went accompanied by your brother and one of your workmen to the lodging of Mr. McCarthy, formerly one of your workmen, who had left the Mint, and whipped him very severely – that this transaction has brought disgrace upon the establishment and subjected you as well as those who accompanied you, to a criminal prosecution.

Your early attention to such course of explanation and refutation as these complaints seem to require, is desired, and in the meantime a copy of your letter will be sent this day to the Director and his immediate attention invited to the other subject mentioned therein.

Very respectfully,
L. W. Secy of Try

Letter #12

John Leonard Riddell to Hon. Levi Woodbury, Secretary of the Treasury. July 14, 1840.

Sir,

I have the honor to submit for your consideration the following reply to your letter of the 24th of June. I will take up the charges therein contained in the order of their enumeration.

1st. (a) That you have unnecessarily quarrelled with and discharged your workmen – (b) that you have lost the regard of your fellow officers, (c) and that you have not succeeded in preserving in the mint the harmony and good feeling so much to be desired, and without which the operations of the mint must be retarded and the situation of the other officers rendered unpleasant.

To begin then,

(a) *That you have unnecessarily quarrelled with and discharged your workmen.*

To this charge I shall plead not guilty. It is true, that for good reasons, which I have set down in writing, and am prepared to establish, I have had occasion since holding the office of melter and refiner, to discharge two or three of my workmen; but with none of those discharged have I ever had any altercation of the least semblance to a quarrel. I prepared a detailed statement of the circumstances attending their dismissal with a view of transmitting it to you; but the accompanying letter of the Superintendent (marked K) since received, will I conceive, meet and obviate that charge satisfactorily. In reference to this, the letter of Mr. Bertrand, who speaks from continued opportunities of personal observation, may also be consulted (vide U). MacCarthy, the only one with whom I had even any verbal altercation, left the mint of his own accord. He, from his own confession, had been inveigled into a plot to do me injury, for which he had been promised advancement in the intended reorganisation of the mint.

(b). *That you have lost the regard of your fellow officers.*

Permit me with deference to remark, that whoever may have been the author of this charge, it would have been more tangible, by averring that for alleged reasons I have *deservedly* lost the aforesaid regard. You cannot expect to hold one man accountable for the arbitrary dislikes and caprices of another; especially as some men are so unreasonable as to consider differences of opinion on matters of business, politics or science, as good grounds for personal enmity.

This charge has been pointedly disavowed by all my fellow officers except the coiner. (See the close of the Superintendent's letter, marked I2; and the assayer's letter near the close, marked P)

(c) *That you have not succeeded in preserving in the mint the harmony and good feeling so much to be desired and without which the operations of the mint must be retarded, and the situation of the other officers rendered unpleasant.*

This too, I must take the liberty of saying, I regard as a general and rather indefinite charge. It would seem to imply that it is especially and exclusively my province to preserve "in the mint the harmony and good feeling" for my *own* part I have ever studied to secure peace. I have found no fault – made no criticisms, preferred no charges, interfered with no other department.

When I first came into the mint, a stranger to most of the officers, I soon saw that we had the elements of discord. On my first interview with the coiner I was astonished to hear him with great warmth and earnestness speak disrespectfully of the assayer, both in respect to his official competency and moral character. I made bold to check him, and told him that heretofore I had not found it difficult to maintain friendly relations with gentlemen who might differ between themselves, without taking sides with either; – that I trusted this instance would not prove an exception. That from personal knowledge and observation I had confidence in Dr. Hort as an assayer; and that I had resolved neither to acquaint nor interest myself with the former difficulties in the mint. I was pained afterward to discover, that this really frank and impartial course of mine was misconstrued. I should not mention the foregoing circumstances did I not look upon it as demonstrating that the want of harmony is really owing to an inveterate, long cherished feud, to which I have refused in any way to become a party.

The only disturbance of good feeling and harmony, in which I have been concerned, has arisen from conflicting opinions on the quality of ingots: – my course in reference thereto has been

open, candid, fair and tending to peace, for proof of which I refer to my letters to the Superintendent (Vide A, B, C, D) From this charge I am exculpated likewise by the testimony of Mr. Bertrand and Dr. Hort (Vide P, T, U)

In conclusion then I assert that this charge cannot apply to me.

2nd. *That you are giving bad ingots to the coiner, and do not seem to be able to make them better.*

The charge at this time cannot relate to silver ingots. What I might here say on silver ingots can be gathered by reference to my letters to the Superintendent (A, B, V) and the letters of the weighmaster (T) and assayer (P).

In respect to the rejected gold, I have had no difficulty in rolling successfully samples from every melt; yet when the same has been returned cracked from the coiner, I have never refused to remelt it, and to the best of my skill and ability endeavored if possible to improve its quality. The accompanying sample was rolled from an ingot of the first rejected mass. (Vide X).

The merits of this controversy can be best judged of, by reading the correspondence on the subject between the Superintendent and myself (Vide C, D, E, F, G, H). It will thus be seen that every proposition or appointment, for test, trial or reference, was rejected or receded from. I was most anxious to send an ingot to Philadelphia for trial in the parent mint; but though at last three ingots were taken from melt No. 14 on the 2nd of July, they yet remain in the treasurer's vault.

I am forced to say, though without any feeling of personal enmity on my part, that I have been wholly at a loss, and am so still, to account for the uncompromising course of conduct pursued by the coiner in relation to the gold. That he was not disposed to cooperate or accomodate, cannot but appear in perusing the series of notes which passed between us, the object of which on my part, was to submit a sample of Melt No. 14, to the test of rolling, as I had successfully the preceding rejected melts. (This correspondence is marked Q from No. 1 to 8)

It is really the assayer's province to decide whether ingots are of proper quality for being coined. I will therefore refer you to his letter on the subject (marked P).

The next day after receiving the reply of the Superintendent (H) to my letter of the 26th of June, (G), I gave him fully the explanation of the cause of the coiner's failure in working the gold "dictating" no terms whatever. This explanation you have in the paper marked M. The day subsequent I made the same explanation in presence of the Superintendent, Treasurer and Coiner; and I am rejoiced to hear from the Superintendent, that on Friday 11th inst. the coiner succeeded in working satisfactorily $8000 of the very gold, melt No. 14, about which we have had so much controversy.

Now from the manner in which a melt of gold is made, and without interruption cast, it necessarily follows that whatever is inherent in the physical nature of one of the ingots, must be so in all the ingots of the melt. Therefore if one portion or ingot of the melt can be wrought, all can with equal facility be wrought. Therefore if one quarter eagle has been made from Melt No. 14 the whole of Melt No. 14 might have been wrought into coins.

I trust now, however, that all difficulties in regard to the gold will disappear.

In conclusion then, I think it has been made apparent, that I have *not* been giving bad ingots to the coiner – that if the ingots had been thin, such as he had previously wrought (Vide M near the beginning) this cracking would have been much less likely to take place. But even admitting that I *had* given "bad ingots to the coiner" and did "not seem to be able to make them better" yet considering that I have held this office little more than six months, and never saw the "communication formerly sent to this mint" on the subject of preparing gold ingots (Vide W). I am at a loss to divine on what good grounds this charge has been made against me.

3. *That the day after the examination of the contents of your vault by the Treasurer, you went accompanied by your brother and one of your workmen, to the lodgings of Mr. MacCarthy, formerly one of your workmen, who had left the mint, and whipped him very severely – that this transaction has brought disgrace upon the establishment and subjected you as well as those who accompanied you to a criminal prosecution.*

I have already entered so fully into the circumstances of McCarthy's case, in the accompanying copy of a letter to Dr. Patterson (S) that I have little to add here. It cannot be considered in any other light than as a private personal affair; for McCarthy did not belong to the mint, and the occurrence did not take place in the mint. I had the greatest possible provocation – and the advice of our superintendent and Treasurer and my friends to chastise him severely. I had their warmly expressed approbation afterwards. In the laws of this state to which I am answerable, a penalty is provided adequate to my offence (There is not however, the *remotest probability* of my imprisonment). In respect to disgrace having in consequence been brought upon the establishment, let me refer you to the accompanying letter from Dr. Jones (R vide also U) which expresses very fairly the opinions and sentiments entertained in this community.

Allow me again to suggest, that neither my duty to the government as a public officer, nor the public interest, is in any way implicated in this matter. It can neither affect my skill nor integrity, nor has it affected my standing in community. Unpleasant it is, I admit, but to no one more so than myself.

Here I close my explanations and here I rest my cause. I cannot resist the impression that you will consider the impeachment as having been satisfactorily met.

To me the inquiry now very naturally presents itself, *whence came these charges?* Our superintendent expresses surprise that I should so misconceive his character as even to inquire of him, whether preferred by him; averring that "it is not in his character to make an attack in the dark. Had it ever entered his mind, to prefer any of the charges, to no one would his intention have been communicated sooner than myself." (Vide 12). Who alleges then, that I quarrel with my workmen, that I have lost the regard of my fellow officers, that I disturb the harmony and retard the operations of the mint, and that I from incompetency make bad ingots and that I have brought disgrace on the establishment?

With the exception of the assayer, we are all equally new and inexperienced. The treasurer only had a copy relating to his own department from those full instructions for every department, sent to this mint on its first organization. The instructions for the coiner and melter and refiner, are said to have been sent last summer to the seat of government. These things considered, I have wondered that subjects of controversy did not much more frequently arise. The conversion of crude bullion into coin, is effected by a series of chemical and mechanical operations, delicate and refined, of which very few are well competent to judge. Now the Director of the present mint, not only has had the benefit of long experience, but he is well known for his profound scientific attainments. Had our worthy, though inexperienced Superintendent, possessed but a share of these advantages, the contentions between the coiner and myself, always relating to physical fact, could never have arisen to any serious height. Nevertheless, one success so far, as shown in the amount coined, is comparatively respectable, though much short of the real capabilities of the mint. (For an estimate of what can be done in my department, Vide V)

The office of melter and refiner in this mint was conferred upon me, during my absence from the country, without my knowledge, and of course without my solicitation. I find it involved great responsibility, and requires the incessant devotion of time, besides calling in requisition all the skill and resources derived from long devotion to chemistry. Had I forseen but a tithe of these unpleasant matters, I should have pondered before accepting the office. But now that my credit is assailed I cannot voluntarily come forward and resign it. My grandsires fought in the revolution. I am an American, and feel too sensibly what I owe to my country and to my own good name, to shrink thus tamely from my duty. One chief consideration actuates me at this time: — that as the wise intention of the government in establishing and maintaining this mint, was to subserve the true interests of the *people,* I see that I may be of essential service in assisting to carry out that intention, and thus to resist the strong and subtle efforts, heretofore made and *at this time* making by the banks to get virtual possession of this mint and turn it to their own account.

With great consideration
I remain your
Very humble and
Obedient Servant,
J. L. Riddell
Melter & Refiner

The following documents are attached to this letter, as noted in the body of the letter:

(A). John Leonard Riddell to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, La. April 20, 1840.

Sir,

You are aware there is a conflict of opinion respecting the quality of the silver ingots which I lately delivered to the Treasurer. In order that truth may be arrived at, I would respectfully suggest that hereafter, commencing this day if you see fit, you take, or cause to be taken, by some unconcerned officer or clerk, indiscriminately from each melt one or more ingots, to be separately weighed and marked, and deposited in the Treasurer and Assayer's assay-piece box. That if then any diversity of opinion should arise between the coiner and myself respecting the quality of the ingots, the whole of those reserved should be transmitted to Dr. Patterson for trial in the parent mint.

Respectfully,
Your obt, Svt,
J. L. Riddell

(B). John Leonard Riddell to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana. April 23, 1840.

Sir,

In your verbal reply to my note of the 21st inst you mention that the mint could not be out of so large a fund as the trial ingots which I proposed would amount to. I would therefore modify my suggestion to the following: While the ingots are passing through the Treasurer's hand, in being delivered to the coiner, let some concerned person take from each melt a single ingot, at random. From the part of this whence the assay is usually taken, let a piece weighing say three or four ounces be cut, weighed, marked and deposited in the assay-box for coins, and lastly sent on to Philadelphia for trial and criticism in the parent mint.

Or, as you suggested, I would willingly submit the ingots taken as above to any skilful and disinterested chemist or silversmith who may be found in the city.

Respectfully, your obt sert
J L Riddell
M & R

(C). John Leonard Riddell to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana. June 9, 1840. Marked "Confidential".

Sir,

I cannot express to you the sorrow that I feel, because the last melt of gold ingots have cracked in rolling.

After the ingot has been rolled to twice or three times its length, it cannot easily be cracked.

In asking the following favor, believe me, I have no other motive but to assist in the conversion of our gold bullion to coin. I would ask through you of the coiner, the use of the gold rollers and annealing furnace for an hour or so to prepare my ingots for delivery, after I make the next melt of gold. I intend to deliver them partly rolled. I feel that my reputation and standing in the mint depend upon it; and so earnest and confident am I in the matter that I am willing to stand or fall by the result.

Truly your
Obedient Sert
J L Riddell

(D). John Leonard Riddell to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana. June 18, 1840.

Sir,

The gold ingots Melt No 14 cast on the 16th inst have been approved by the assayer, and are now in my vault. I shall hold myself in readiness in presence of your self and the officers of the mint as you suggested to have their toughness, quality and fitness for coinage tested, at anytime you may designate. If afterwards the parties chiefly interested should entertain different opinions, I would respectfully suggest that you select an ingot from the melt, and permit its being sent to the Philadelphia mint for trial.

Respectfully,
Your obt servt
J L Riddell
M & R

P.S. I have devised a simple mode of filing ingots by machinery. A common small iron turning lathe is the principal item of expense. By this plan I expect a day's work of a man, with a file, can be accomplished in half an hour at most. As there are several lathes in the mint, I would ask you whether I cannot be accomodated, at least with the temporary loan of one to make the experiment. I would also like the steel instrument made by Mr. Pratt, while in my employ, working at the ingot moulds.

J.L.R.

(E). Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana to John Leonard Riddell. June 19, 1840.

Sir,

You will be pleased to make your delivery of the gold ingots mentioned in your note to me of this morning — I am desirous that all our rules and forms for the transaction of business should be strictly adhered to, and consider that any experiment upon these ingots before a regular delivery to the coiner made in his department, would be a departure therefrom — I shall direct him, after he will have tried 8 or 10 of them to make a report to me. If he fail to work them, we can *then* resort to the test of which you speak.

Resp. y'Obt Ser't
J.M. Kennedy
Supt

P.S.
I find that the "several lathes in the mint" mentioned in your postscript are in the department of the Coiner, by whom I am informed, that he has constant use for them *all.* The steel instrument you also refer to was made by the foreman of that Depart., assisted by one of the men for the use thereof, and properly belongs to the "machine shop."

J.M.K.

(F). Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana to John Leonard Riddell. June 26, 1840.

Sir,

I stated to you, some time ago, that I had laid before Dr. Patterson, the conflicting opinions of yourself and Mr. Tyler respecting your three or four last melts of gold, and had requested him to furnish me with some test by which I might judge of the fitness for coinage, of the ingots made by you for the Coiner, as I was myself unable to determine between you.

I thought however, and you will recollect, so said to you, that, with a view of paying off our gold debt, which had existed for some time, and was not very large, we might, in the meantime, in an amicable way, and without intending, whatever might be the result of our experiments, that either party should consider himself as having achieved a triumph over the other, succeed perhaps in working enough of the gold to accomplish that object.

I now find that the thing has taken a turn entirely different from any that I had ever intended, and that the issue of the trials which were to have been made yesterday morning, was to have the basis of a settlement by me of a question which I had already acknowledged my incompetency to pronounce, and which I had referred to the Director of the Mint at Phila.

Upon inquiring, at the Treasurer's office, I find that all the gold certificates that are out are in the hands of the Bank of La. of which Mr. Cammack is a Director, and am informed by that gentleman that the Bank is in no hurry for payments.

Under these circumstances I have two reasons for opposing any further attempts to work this gold, and waiting the decision of Dr. Patterson which we must now receive in the course of a very short time, and to which we must at last submit.

The first is that we have no *immediate* use for gold coins– The second, the entire absence *on both sides* of that spirit in which the operations were, as I hoped, to have been conducted, and the existence, between the officers interested, of feelings on the subject, which for the sake of the Mint should never have arisen, and to the aggravation of which it shall not be said that I have knowingly contributed.

Respectfully,
Y'obt Servt
J M Kennedy
Supt

Dr. J.L.Riddell
Melter and Refiner

(G). John Leonard Riddell to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana. June 26, 1840.

Melter and Refiner's Office, New Orleans,
26th June 1840 2 p.m.

J M Kennedy Esq
Superintendent
Sir

I acknowledge the receipt of your note of this morning.

I cannot conceal the disappointment I feel in not having met you this morning at 10, as per your appointment, having had an opportunity agreeably to our conversation and your note of the 19th inst, to demonstrate the toughness and malleability of the gold ingots.

It is not a "triumph" which I wish to "achieve". I wish to establish a plain fact, and relieve myself from a false imputation. Our mint coins no gold. Depositors have withdrawn their deposits or sold their certificates at a discount. Public interest is suffering. The mint does not fulfill its destiny. The whole blame is laid by the coiner to my charge, and his assertion is received by many others who hear nothing expressed in opposition to it. You profess yourself to be unable to form an opinion, whether he or myself are in the wrong. The coiner reports to you the particulars of his *failing* to roll the ingots. But when asked for 10 minutes use of a pair of rollers – any one pair out of five or six in the rolling room, he at first frames trivial excuses and lastly informes me (note of June 25th) that you "wish no more experiments to be made until by your own direction."

Thus I am denied the ready and palpable means of eliciting truth and relieving my official credit. The plain path of duty is before me, and personal considerations shall never cause me to lose sight of what I owe to the government and the country. Had not the coiner in the commencement of this controversy, in your presence, assured me that he "perfectly understood the whole subject of gold ingots and wished for no hint or suggestion from me" the gold in question would ere now have been made into coins, and instead of a total cessation, large deposits of gold would still have been coming in.

Those ingots can be rolled in accordance with the directions from Dr. Patterson and I am ready to point out both by experiment and in writing, wherein the coiner fails: – and this I will do at any time, on your written command, accompanied with a pledge to see the same carried into execution.

All personal considerations aside (and no one shall be more forward to bury personal difficulties than myself) I deem it my duty as a public officer to make you the foregoing communication, the last but one on my part I hope, of the golden correspondence.

Respectfully,
Your ob't S't
J L Riddell
Melter and Refiner

(H). Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana, to John Leonard Riddell. July 2, 1840.

Sir,

I must correct a misapprehension under which you are labouring, arising from a note of the 25th Inst. rec'd by you from the Coiner.

He says to you in that note, upon your application for "ten minutes use of a pair of rollers" that "I wish no more experiments to be made until by my direction." Now Mr. Tyler could never have understood it to be my intention to interfere with any disposition which he might have to accomodate you with the use of a pair of rollers, whether for ten minutes only, or any other period, and I have so written to him – The postponement until after hearing from Dr. Patterson, had reference entirely to the experiments which were to have been made in my presence and that of the other officers of the Mint, and my reasons for ordering it I have already given you.

You will permit me to say, that your official credit has suffered more, in your imagination than any where else. I have never since the commencement of this controversy heard your capacity questioned any more than the Coiner's and if Mr. Tyler has, as you say, laid the whole blame consequent upon the want of gold coinage upon you, you have retaliated, and severely too, by saying that you believed he cracked your ingots designedly.

(An insert in Riddell's handwriting: (*) This however I have kept to myself.
Written on opposite page: (*) vide Letter J.)

In your note to me of yesterday, which I did not receive until this morning, you say you know why it is that Mr. Tyler fails – I am sorry that you have thought proper to *dictate* as you have done, the terms upon which alone you are willing to communicate the information.

Very respectfully your
Ob't Serv't
J M Kennedy
Supt

Dr. J. L. Riddell
Melter and Refiner

(I.1.) John Leonard Riddell to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana. July 7, 1840.

Sir,

I received yesterday for explanation from the Secretary of the Treasury, a copy of certain charges made against me.

They are as follows, viz:

(Here the charges were set down verbatim)

J.L.R. Parenthetic Insert

Permit me respectfully to inquire whether these charges were wholly or in part proffered by yourself. If but a part of them were made by yourself, be pleased to designate the same to me, and oblige

Respectfully your
Ob't Ser't
J L Riddell

(I). Joseph M. Kennedy to John Leonard Riddell, July 9, 1840.

Sir,

I have not until this moment had the leisure to reply to your two notes of the 7th instant, in one of which you inquire of me whether certain charges against you therein enumerated, and submitted to you for explanation by the Secretary of the Treasury were "wholly or in part proferred by myself."

This inquiry on your part has excited within me a feeling as well of nortification, as surprise, for I had flattered myself, that during six or seven months of daily official intercourse with me, I had afforded you opportunities enough of seeing, that it was not in my character, to make an attack in the dark. Had it ever entered my mind to prefer any kind of charges of which you have spoken, to *no one* would my intention have been communicated sooner than yourself. Three instances alone, if I remember right have occurred in which I have had occasion to mention your name to Dr. Patterson, in connexion with anything like an undesirable state of affairs in the Mint.

When I replied to his inquiries about the discharge of two of your workmen, my statement was *read* by *yourself* and approved as containing the exact circumstances of the case.

The second instance, grew out of the controversy between the Coiner and you about the *gold,* and the manner in which *that* matter was laid before the Director was submitted to, and recognized by, both that officer and yourself as correct.

The last was in obedience to an imperative duty, of which I apprized you at the time. It was the representation of your affair with McCarthy, given without word of comment upon your conduct, and for reasons with which you were by me made fully acquainted.

I cannot omit the opportunity now offered, of rendering to you the expression of deep regret I experience at the misunderstanding which has existed for some time between you and Mr. Tyler. The question appears to have grown into one of *qualification* of *skill,* in which the pride of each is exclusively involved – Hence, each one of you, in the full conviction that he is thoroughly acquainted with his own business, is unwilling to listen to any thing from the other, in the way of suggestion – this is a state of things to which I can foresee no end, so long as we have any metal, either to melt or coin, unless a feeling, which, with us all, should be stronger than any other, to wit, a desire for harmony and peace throughout the establishment, should bring about between you a better understanding founded upon a spirit of mutual concession.

I have never, to any one, given the slightest intimation that you had lost my regard. You have not done so.

Respectfully
Your Ob't Serv't
J M Kennedy
Supt

Dr
J.L.Riddell
Melter and Refiner

(J). John Leonard Riddell to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, La. July 11, 1840.

Sir,

I make here in writing an explanation, which you will remember, I did verbally, the day after receiving your letter of the 27th of June. You misunderstood a remark of mine while we were in private conversation. I said, that as I had rolled the gold ingots without difficulty, and could do it at any time, they must be cracked in the coining department, either through ignorance or design.

I *do not* wish to be understood as accusing the coiner of doing me such great injustice intentionally.

In brief reply to yours of the 9th inst. let me assure you that I desire peace. I have borne and sacrificed much in hopes of maintaining it, and will bear and sacrifice more if it can still be compassed.

I am no agressor: – I have made no complaints, – I have preferred no charges: – I have often said in relation to the coiner and myself, we are comparatively inexperienced; let us cherish a desire to cooperate; and if difficulties arise canvass them with a spirit of forbearance. Questions have arisen, and questions too affecting my skill or competency, yet I have still signified my willingness to receive and act on, any relevant suggestion from the coiner or any other source: or to submit the subject matter to any or every test, trial or reference. But have I been met on such open ground? In lieu thereof have I not been impeached at the seat of government? In justice to yourself

permit me to say that I never for a moment supposed that you were privy to this "attack in the dark."

In conclusion I will add that I am heartily tired of contention and will pledge myself to second any efforts to establish harmony.

Respectfully,
Your obedient ser't
J L Riddell

(K). Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, Louisiana, to John Leonard Riddell. July 11, 1840.

Sir,

It affords me pleasure to inform you, that I have heard from Dr Patterson, in reply to my letter giving him the circumstances alluding to the discharge of the two workmen from your Department, and that he expresses his satisfaction with the grounds assigned by you for their dismissal.

Resp'
Y' Ob' Serv't
J M Kennedy
Supt.

Dr. J.L.Riddell
Melter & Refiner

(L). Working of Gold Ingots

When the ingots have been tapped and filed, they are annealed by the coiner, after which they are formally delivered to him. The process of working them is then as follows:

1. They are rolled successively to the length of 2 feet, 4 or 5 inches – they are then annealed, and pickled exactly as another ingot.
2d. They are again rolled to the length of 3 ft 7 or 8 inches. They are next bent once, annealed and again pickled.
3d. They are then rolled to the proper thickness. Care must be taken in rolling, not to take too great a pressure at any time. The last time they are passed through twice, without altering the screws of the rolls.
4. They are now cut into two pieces, and each piece is bent into three; and to render them fit for drawing, they are again annealed and pickled.
5. Next they are pointed.
6. They are then heated until they can just be held in the hand, and in this state dipped into wax heated nearly to boiling. The wax being the best yellow beeswax, without tallow. After dipping they are laid upon a board prepared for the purpose, when they are turned backward and forward, for the purpose of chilling the wax, and distributing it equally over the surface. They are now ready for drawing and cutting. To enable the pointed end to enter the drawplate the point must be heated and this is best done by holding it on a copper plate, heated by a spirit lamp.

(M). Explanation of the cause of the coiner's failure in rolling the gold ingots, received by him since the middle of May, 1840. By J.L.Riddell, Melter and Refiner.

I will premise that the ingots previously rolled by him were all if I mistake not, of the kind called half eagle ingots, which are 9/10 or 18/20 of an inch broad by 9/20 of an inch in thickness. All delivered to him since have been at his own request quarter eagle ingots, which are 13/20ths of an inch broad, by 11/20th of an inch in thickness, in fact shaped like square rods. The latter require greater skill and knowledge to be properly rolled; for all workers in gold know well that it is easier to laminate successfully thin, flat ingots than such as are square or thick: and the reason of this will upon a little reflection appear obvious.

I will here set down some well established physical facts.

1st. "A gold wire 1/13 of an inch in diameter will sustain only 150 lbs Avoid." hence there is a limit to the strength of gold.

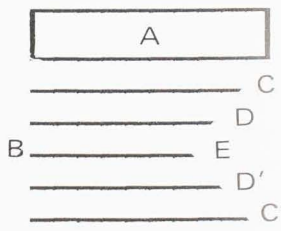
2nd. Standard gold ingots are one percent more dense or less bulky, after having been well hammered to laminated, than before.

3rd. The most ductile gold loses its ductility after having been beated or laminated to a certain extent, and can be made to recover it only by being heated or annealed, so as to loosen or lessen the forced cohesion among the particles. A red heat is the most proper temperature for annealing. Gold heated to near its melting point and suddenly cooled is rendered brittle. (Silliman's Chem. Vol. ii p. 350.)

I attribute the past failures in rolling the gold to improper annealing; for gold ingots as they are suddenly cooled from the melting point in being cast, are unfit for rolling until after they have been properly annealed; and any defect in that operation caused by heating them either too low or too high would be prejudicial.

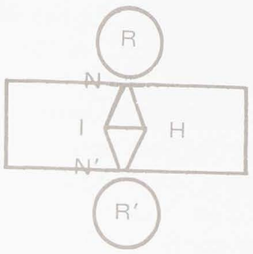
But even supposing them to have been well annealed, they are still liable by bad management to be cracked in rolling; and to aid in explaining how this may happen, I will here detail two among many many experiments which I made in reference to the matter.

1st. Take say 5 slips of ductile sheet gold, cut of equal length in the form represented at A. Lay them upon each other in a bundle, with the ends even, as at B.



Beat them by delicate blows thus on an anvil with a light round faced hammer; or press them lightly and repeatedly between steel rollers. It will soon be observed that the outer slips C, C' elongate more rapidly than the slips D, D' and that the middle slip E is drawn out last of all.

2nd. Prepare 5 similar slips and beat them with a heavy hammer or pass them between the rollers with a heavy pressure, and they will all elongate equally.



Now in passing in ingot (PS) lightly between the rollers (RR') the rollers may be considered as exerting the compressing force in a progressive line, crossing the ingot where they come in contact with it (NN'). But towards the centre of the ingot the force becomes more diffused and less intense until at the centre it may be considered as extending from I to H, where it is far short of being adequate to compress the metal one per cent. In this way by repeated light rollings the surface becomes condensed and rigid, while the interior of the ingot is yet malleable and little affected.

In all Mr. Tyler's experiments as reported to the superintendent (vide N) this very condition of things obtained. I will take his experiment on Ingot No 1 as an example. Here he says "annealed" or "passed 11 times through the rolls, giving in all a half turn of the keys, and drawing about 2 inches in length." Let us suppose that by the time the ingot had been thus very lightly passed 5 times between the rollers a ribband of hardened, compressed inextensible gold 1/10th of an inch in thickness becomes formed on each rolled surface. Now on the 6th time passing through the malleable gold within is compressed and elongated and the surfaces have to bend to the rollers and elongate too. But as without annealing these hardened surfaces will bear no further extension, they necessarily crack and give way.

This could not happen if a bold pressure were given at first, sufficient to compress the whole substance of the ingot, 1 per cent in volume, beyond which it could not be rendered more dense. The whole would then elongate simultaneously, like the slips in my 2nd experiment before cited.

The very first time passing the ingot between the rollers a full quarter turn pressure or more should be given to it, instead of one sixths that pressure as in the coiner's experiments; and this should be followed by quarter turns, for several times successively, until a second annealing becomes necessary. In this way I have succeeded in rolling properly and without failure or fault, samples of every rejected melt of gold.

(N). P. B. Tyler, coiner, Branch Mint, New Orleans, Louisiana to Joseph M. Kennedy, Superintendent. June 23, 1840.

Dear Sir,

In answer to your letter of Saturday last I am sorry to say the gold ingots will not work in the ordinary way. At the time of receiving the ingots I was informed by the M & R that they had been annealed and hammered, and afterwards annealed and pickled by himself, and that they were ready for rolling.(*)

(*) Note by Riddell — The coiner here misunderstood me, as I immediately apprised him when I became aware of it. I had annealed for the purpose of pickling as our regulations require previous to delivery — not with the care requisite to prepare for rolling. J.L.R.

Upon this authority I thought I would roll some of them without first annealing them myself, but in attempting to straighten them from the crooks they had received in hammering, one ingot was accidentally broken, which led me to suppose that the others were equally brittle. I then tried them by striking across the corner of the anvil, and some of them broke with almost the brittleness of glass. I then took five (5) ingots indiscriminately from the lot, and passed them 6 times through the rolls, giving them 1/8th of a turn of the keys at each time, stretching them in lengths about two inches in all: at the very first time passing through the cracks could be seen very plain, which continued opening wider until the 6th time, when they had not lengthened more than two inches (notwithstanding the Directive inform that they should be successively rolled to the length of 2 ft 4 or 5 inches, before annealing the second time). Four or five more were then rolled in your presence with the same result, after which I received your note above mentioned. Not feeling satisfied to report upon them without trying some of my own annealing I stated the same to you and received in answer your request to make further trials.

I then took 3 ingots and marked them Nos. 1, 2 & 3, which I annealed and rolled as follows: No. 1 — not hammered — annealed at nearly red — dipped in pickle — passed 11 times through the rolls giving in all a half a turn of the keys, and drawing about 2 inchés in length — cracked on the surface — annealed again at the same heat — pickled — rolled four times through — drawn one inch — cracked too bad to finish.

No. 2. — Hammered by the M & R — annealed at lowest red heat — rolled the same as No.1 — annealed at the same heat as at first — pickled — rolled again 4 times — drawn one inch — cracked same as No. 1.

No. 3. — Hammered by my foreman — annealed at cherry red — pickled and rolled same as Nos. 1 and 2, annealed at same heat as at first — pickled — rolled four times — cracked some the same as Nos. 1 & 2 — rolled 6 times, cracking more at each time.

I then took 4 ingots and rolled them to the usual length of 30 inches, at which length the cracks on the sides had nearly disappeared or drawn over each other, but the edges were quite rough. I then selected the worst and the best of the four, and annealed them at a moderate heat, then rolled them to the proper length for drawing: — the worst is entirely unfir for coins; the best would be subject to great waste in drawing, and if it could be drawn to the proper weight many of the pieces would be imperfect. I wish you to examine the pieces with which the experiments have been made, and if convenient, I should like you to witness some of the experiments as above. If then you should request me to make as much of it as

possible into coins, I will cheerfully do so, notwithstanding the great waste which must necessarily occur.

Very respectfully
Your faithful servant
P B Tyler,
Coiner

(O). John Leonard Riddell to Dr. Hort, Assayer, Branch Mint, New Orleans, Louisiana. July 9, 1840.

Sir,

The second charge preferred against me at Washington reads thus: —

"That you are giving bad ingots to the coiner and do not seem to be able to make them better." As you assay every melt of standard bullion made by me, be pleased to address me a statement as to the quality of the approved ingots both in silver and gold.

And further, as inquiry has been made by Dr. Patterson whether the dismissal of Mr. Levic from my employ on the 14th of March was not the immediate cause of defect in the gold ingots, be pleased to state how many melts of gold were made by me afterwards and rolled by the coiner without complaint.

Respectfully,
Your Ob't Serv't
J L Riddell
Melter and Refiner

(P). Dr. William P. Hort, Assayer, to John Leonard Riddell, July 9, 1840.

Dr. Sir,

I have recd your note in which you state that another charge preferred against you at Washington is

> "that you are giving bad ingots to the coiner and do not seem to be able to make them better."

It seems strange that so indefinite a charge should be brought against you. I have assayed for you 340 melts of silver ingots since you took charge of your department, all of which appeared to me to be sufficiently tough except a few melts cast about the last of March from a deposit of Mexican bullion made by Zacharie and Co. I reported those ingots as too brittle. About that time I heard that the coiner had rejected several melts of ingots, but as I had duplicate assay pieces in my possession, which it was proposed to send on to Philadelphia together with an ingot from each melt that might be rejected, complaint suddenly ceased. And I have heard none since; indeed I know that all the ingots since that time have been coined. The charge therefore cannot allude to silver ingots.

During the same time I have assayed for you 14 melts of gold ingots, three of which I rejected on account of the title; they all however appeared to me as far as I could judge from the operations carried on in my department, to be sufficiently tough. I am aware that from the time the coiner ceased complaining about the silver ingots that is since the 15th of May, 5 melts of gold ingots have been rejected. As the mint has suffered much on this account, from the inability to pay some gold certificates, and the consequent suspension of gold deposits, which before that time were flowing in very freely, I deeply regret that your proposition relative to the rejected gold ingots was not accepted. You had succeeded in rolling some of them, were confident that you could roll them all, offered to do it in presence of all the officers and resign if you failed. It appears to me that this was the simplest, shortest and easiest way of deciding satisfactorily which offer was in fault, and what remedy was necessary to correct the existing evil — At least as the proposition came from you, it seems but reasonable that you should be relieved from responsibility in the case.

In reply to your other enquiry I have to say that after Mr. Levick left your department I assayed and passed three melts of gold ingots on the 24th of March and 6th and 26th of April, which were successfully rolled and converted into coin, and repeat that it was only when the coiner's position became untenable in reference to the silver ingots, that the gold ingots were rejected.

I remain respectfully,
Your friend
Wm P Hort
Assayer

J L Riddell MD
Melter & Refiner

P.S. Recollecting that you informed me that one of the charges brought against you was "that you have lost the regard of your fellow officers"

I take this opportunity to assure you that you have not lost my regard; On the contrary my respect and esteem for you have increased as I have become better acquainted with you; and I am persuaded that the office you fill could not be better supplied than it is at present; I speak this positively from a knowledge of your scientific attainments, and practical skill as a chemist.

&
Wm P.H.

(Q). John Leonard Riddell to P. B. Tyler, Coiner, Branch Mint, New Orleans, Louisiana. June 23, 1840. 8 a.m.

Sir,

I have a favor to ask, for which in good faith I shall be happy to reciprocate anything in my power. I wish for twenty minutes opportunity of using some one pair of rollers in the rolling room, in order to put certain theoretical idea of mine to the test of experiment. They have relation to the toughness of gold, and I shall be happy to have you present if you think proper.

Permit me to add, that as the great interests of the public require a cooperation among the officers of public institutions I shall ever hold myself in readiness to canvass such difficulties as arise between us with a spirit of accomodation, and a sincere desire to arrive at truth.

The favor of an immediate reply is requested.

Respectfully,
Your Obt.Sert.
J.L.Riddell
Melter and Refiner

(Q.2). Philos B. Tyler, coiner, Branch Mint, New Orleans, Louisiana to John Leonard Riddell, June 23, 1840.

Sir,

I received your note of this morning to which I reply.

That a series of experiments are now going on in the rolling rooms for the purpose of ascertaining if the gold which was delivered to me on Saturday last, can be worked into coin, in conformity with the law.

If after those experiments are completed my report upon the same, does not cover the whole ground of your inquiry, I shall be happy to comply with your request of this morning, notwithstanding your direct refusal (*) a few days since, of my using one of your melting furnaces in some experiments of the same nature.

Permit me to add that I have a great desire to cooperate cordially with the officers of this institution, and no one can be more ready to adjust any difficulties which may arise, or more sincere in the desire to arrive at the truth than myself.

Respectfully
Philos B. Tyler
Coiner

(*) See over.

(*) I gave Mr. Tyler full permission to use my furnaces, pots, & by himself or his workmen, for the purpose of experimenting on bullion in *his own custody;* but declined having him operate thus on bullion in my custody; thus never denying him favors similar to the one which I vainly asked of him.

JLR

(Q.3). John Leonard Riddell to P.B.Tyler, Coiner, Branch Mint, New Orleans, Louisiana. June 24, 1840. 2 p.m.

Sir,

As your experiments are completed, and your report thereon in the hands of the Superintendent, I would now ask the favor of being permitted for my own gratification, to use a pair of rollers for half an hour this afternoon, in experimenting on some bullion in my custody.

Please reply immediately.

Yours respectfully,
J.L.Riddell
M.& R.

P.B.Tyler,Esq.
Coiner

(Q.4). P.B.Tyler, Coiner, Branch Mint, New Orleans, Louisiana to John Leonard Riddell. June 24, 1840.

Sir,

I have just received your note of this afternoon, In the reply to which I would state that the rolls will not be in operation this afternoon, and that I have an engagement with the Supt. tomorrow morning by which they will be occupied until those experiments which I spoke of my last are completed – I think they will be at your command at 10 o'clock.

Respectfully,
P.B.Tyler,
Coiner

(Q.5). John Leonard Riddell to P. B. Tyler, Coiner, Branch Mint, New Orleans, La. June 25, 1840.

Sir:

As the rollers are now in operation, you will excuse me for asking to be permitted to use a pair a few minutes; for at 10 o'clock and after I shall be absent and indispensably engaged.

I wait your reply.

R Respectfully,
Your Obt. Sert.
J.L.Riddell
M&R

(Q.6). P.B. Tyler, Coiner, to John Leonard Riddell. June 25, 1840.

Sir

I am now using the rolls myself in the experiments which I stated to you last night.

P.B.Tyler

Note: It is worthy of recollection that as Mr. Tyler could use but one pair of rollers, any one of the four idle pairs would have answered by use.

J.L.R.

(Q.7). John Leonard Riddell to P. B. Tyler, Coiner, June 25, 1840, 3:30 p.m.

Perhaps it would suit your convenience to spare me a few minutes use of a pair of rollers just now. I shall feel quite obliged to you if such is the case.

Respectfully,
J.L.Riddell
M&R

(Q.8). P. B. Tyler, Coiner, to John Leonard Riddell, June 25, 1840, 4:00 p.m.

Sir,

I have this moment received your note, but had previously given orders to stop the engines at 4 o'clock.

Mr. Kennedy informed me this morning that he desires no further controversy between us – and wished no more experiments to be made until by his direction.

Respectfully,
P.B.Tyler,
Coiner

(R). Dr. James Jones to John Leonard Riddell. July 8, 1840.

Dear Sir–

I observe that serious charges have been made

against you particularly in relation to having inflicted personal and well merited chastisement upon John McCarthy, formerly employed by you in this mint. It is perfectly true that this act has subjected you and those whom you invited to witness to a criminal prosecution – but I have to learn for the first time that it has brought disgrace upon the establishment of which you are an officer – Indeed by the universal opinion and custom of this community the only disgrace would have been to permit a man who has assiled your public and private character to go unpunished. McCarthy stated to me and to others that you were dishonestly appropriating the publick property committed to your charge – that you had disposed of the bullion at a premium – which if called on suddenly you could not explain and that by reason of incompetency added to this an examination into the contents of your vaults would prove you to be a defaulter – to the public injury and to the ruin of myself and others who were on your bond. (I was present at the investigation made by your request by the Treasurer and Superintendent and I have only to add that I was as well satisfied as they were that you had in your possession everything intrusted to you).

This McCarthy further disclosed that not only were you incompetent and dishonest but contemptible and cowardly – that he had demanded personal satisfaction of you for certain alleged insults – and to use his own expressive language

"had made you hang your ears like a dog."

He did not even hesitate to disclose that he knew of occurrences in relation to a member of your own family repugnant to everything honorable and humane.

I will only add that all your relations with McCarthy previously to this occurrence were those of a preceptor and benefactor and that in inflicting upon him this chastisement he took so much trouble to cause I am compelled to declare that I knew you to have been actuated more by the advise and influence of your friends both within and without the mint than by any personal feelings of your own – and that although his own vindication, feelings and probably the motives of others have made this the ground of a serious charge upon your official standing–that few men in this community would have treated him with so much moderation.

Your obedient servant,
James Jones

(S). John Leonard Riddell to Dr. R. M. Patterson, Director, United States Mint, Philadelphia, Pa., June 28, 1840.

Sir,

Mr Kennedy showed me yesterday a letter received from you, written in consequence of an exaggerated report of an assault on John McCarthy having indirectly reached your ears. The particulars

> "McCarthy being at the time employed in the mint, was brutally assaulted with clubs, bowie knives, etc. and that the mint had stopped in consequence of the offending parties, having been bound over to court."

I quote from your summary and may be partly incorrect.

In consequence of the inquiries you make of Mr Kennedy I deem it my duty, though unasked, to lay the leading circumstances before you.

I apprised you in my last letter, that in consequence of his persevering importunity and from charitable considerations I had admitted McCarthy to a laborer's station in my department. He became deeply disaffected because I found him unworthy of promotion, and implicated himself and others in plots to injure me. Having been a student of our medical college I was loath to discharge him, but earnestly and repeatedly advised him to find some other employment. He was well aware I had lost confidence in him. On the 26th of May at noon, refusing to file a saw, he quit work, informing me that he no longer considered himself as belonging to my department. He then set about publishing in the community the vilest slander he could invent. He made statements to my securities which determined me to expose my vaults to inspection. He then caused the publication in the Sun newspaper which you have seen; heading it "Rather suspicious, alias Melting and Refining." That his conduct was insupportable and aggravating in the extreme, will appear by the following written statement of Dr. James Jones, one of my securities, a gentleman of high standing. Immediately after leaving the mint, McCarthy called on him.

(Riddell note: Here followed a detailed statement of the slanders since condensed by Dr Jones into the accompanying letter by him, which see above, Marked R).

It is perhaps to be regretted, but public opinion in this climate, as you are doubtless aware, sanctions and under similar circumstances, requires a resort to personal chastisement for slander like the above, so bare, so palpable and so utterly unfounded in truth.

McCarthy was no longer connected with the mint. The medical college of whose faculty I am a member had conferred the degree of Doctor of Medicine on him, which alone gave him a claim to respectability. My friends, among whom were Messrs. Kennedy and Cammack, warmly urged me to chastise him; and this I did on the piazza of his boarding house, having in company with me two individuals who took no part, to mark that I neither used nor displayed any weapons, more formidable than my flat hand. This was on the first of June. When I had thus rebuked the slanderer, my conduct was cordially approved by Messrs. Kennedy, Cammack and Hort, and all who knew the circumstances, and the tone of public feeling.

It is true, in McCarthy's complaint I have since been convicted in the Criminal Court of assault and battery, and am defendant for a civil action for damages based on the same. In the civil action a reconvention for slander will be allowed, and mitigating testimony will be received in the criminal court, where the judge declines pronouncing sentence until after the civil action shall have been decided, say perhaps two years hence. The judge of the criminal court assures me that as my

presence is indispensable at the mint, if after he shall have heard the mitigating testimony — concerning the slander which led to the assault — he shall then find it his duty to visit me with a severe sentence, he will do by a fine instead of imprisonment.

In conclusion then, let me remind you that the assault *did not take place in the mint,* that McCarthy at the time was *disconnected from the mint,* — that my provocation was beyond human endurance — that my friends and impartial persons sustain me in what under the excitement of the moment I did: — and that great allowance must be made in estimating a summary act, required by the tone of public feeling in a community. If under the excitement of deep injury I transgressed the strict law of the land, I hold myself amenable to that law, and shall abide its penalty.

Respectfully your
obt sert
J L Riddell

(T). John Leonard Riddell to J. Bertrand, Weighmaster, United States Branch Mint, New Orleans, La. July 10, 1840.

Sir,

I take the liberty of inclosing you a copy of charges preferred against me at Washington city. As during the daytime you have been constantly at your post in the weigh room, and have exclusively attended to the transfers of bullion; and as, therefore, better than any one else, you can appreciate the merits of some of their charges, you will pardon me for asking from you such comments thereon as you may please to make; especially in regard to my disturbing the peace of the institution.

Yours respectfully,
J.L.Riddell

(U). J. Bertrand, Weighmaster, United States Branch Mint, New Orleans, La. to John Leonard Riddell. July 13, 1840.

Dear Sir,

I have received your note of the 10th inst accompanied with a copy of certain charges, preferred against you at Washington City.

In answer to the first charge, I will say that during the 9 or 10 hours that I remain daily in the mint, attending to my duty, and having frequent access to your department I have never seen, nor heard of any quarrel between you and any workmén in your employ. That some have not done their duty, I know from personal observation, and as to the dismissal of one certain McCarthy, I will observe, that I happened to be present (and you not in the melting room at the time) on or about the 25th of May when one of your workmen, named King, very active and quick, turning out the Ingots from the moulds, faster than he (McCarthy) could put them up, caused said McCarthy to get into a violent passion. He (McCarthy) then observed that he could not stand at such work, and said "I be d..d if I continue in the Mint any longer."

The next day, he came to my office, and asked me "if Dr Riddell had left his account, that he wanted to receive his pay."

I answered no, and that I had nothing to do with his account, nor with Dr. Riddell respecting it. He then commenced some abusive language towards you, when I ordered him out of my office.

In all the controversies that have existed between you and the coiner, in my presence, you have shewn at all times, that spirit of moderation and a natural disposition to sacrifice all self-love, to arrive at the truth, which should always be the characteristic of a gentleman, and especially of an officer, under oath to protect and defend the interests of the Government. I will further observe, that I do not know of any circumstance that has taken place in which you could have been the cause of retarding the operations of the Mint.

In answer to the second charge, I will remark that I cannot constitute myself judge of the good, or bad quality of silver and gold ingots. This decision can be given only by the Assayer. But, however, I think it proper to observe that during the month of March last nearly 20,000 ounces of silver ingots, partly rolled, were returned by the Coiner, for the assigned reason, that they were not fit to be rolled for coinage. This created the first difficulty which took place between you and the Coiner. You appeared to be so well convinced that they were fit to be wrought, that after receiving the same from the Coiner, you requested the Superintendent to take out a Sample of the Strips returned to be forwarded to the mint at Philadelphia. I am ignorant of the steps taken respecting this difficulty and of any decision on the subject; but since that period, there has not been a single complaint made by the coiner, respecting silver ingots. In reference to the difficulties that have arisen about gold ingots I have given my views in the answer to the first charge; but I must here state that, to satisfy both parties, and at your own request, the Superintendent decided to send on to the Mint at Philadelphia one or two Ingots of this last make, in order to have this matter decided there.

In answer to the third charge, I will say that I was present at the trial before the Recorder, and that not a single witness testified that you had severely beated McCarthy. One only named Ernst (who had been in your employ sometime previous and dismissed) declared that he saw you when you took him (McC) by the hair, and struck him a blow behind the head with your hand. The reason you took two persons with you was mentioned at the time. It was to prove that you did not attack McCarthy with any weapon, because you were certain that he (McC) would make an affidavit, declaring that you intended to kill him.

Far from having brought disgrace upon the mint your conduct has been approved by everyone who knows you and by the Superintendent himself. The only regret your friends have, is, that you did not give him that chastisement, which his vile and infamous conduct towards you so justly deserved. I might have given you more particulars, in answer to the questions put to me; but I think

the above explanations will be sufficient for the present.

Respectfully,
Your friend and Servant
J. Bertrand
Weigh-master

(V). John Leonard Riddell to J. M. Kennedy, Superintendent, United States Branch Mint, New Orleans, La. June 22, 1840.

(Here followed a plan for a filing machine)

The successful introduction of the large pot in melting silver renders this improvement necessary. This pot can now be inspected after just one month's use, in the course of which time, twelve melts have been made in it, equal to 150,000 standard ounces. Not an ingot has been condemned by the assayer, or found fault with by the coiner. I can constantly and with ease make one melt a day of 13,000 to 16,000 ounces net, amounting to more than 338,000 ounces monthly. With the filing machine in operation, I can if required double that amount, or furnish ingots for a silver coinage of more than $4,000,000 annually.

I should suppose from present appearances the pot would last three or four months longer, in everyday use.

On the plan pursued in melting when I came into the mint, a small pot seldom lasted to melt more than 8 or 10,000 ounces of ingots, and often bursting and spilling the silver in the fire.

Thus great economy attends the use of the large pot not only in the expense of the pots themselves, but in fuel, wastage of silver, labor, etc.

Another important result attainable by the large pot, is strict uniformity of standard of the coinage.

Respectfully,
Your Ob't Servt
J L Riddell
Melter and Refiner

(W). Extract of a letter from John Leonard Riddell to Dr. R. M. Patterson, Director, United States Mint, Philadelphia, Pa., June 8, 1840.

After detailing the difficulties with respect to the gold ingots, and exactly my mode of preparing them I add

"If I am wrong in opinion or deficient in knowledge of the matter I beg as a personal favor, and as a consideration of, similarity in our tastes and former pursuits, that you will frankly set me right and communicate such useful information as your superior knowledge and long experience will enable you to do."

I have received as yet (July 14) no direct reply. But in a letter of June 27th to our superintendent, Dr. Patterson says

"The process followed by us (in making gold ingots) was explained in a communication formerly sent to your mint, and which I presume came into the hands of Dr. Riddell."

It never came into my hands.

The Doctor then after giving a "general view" of the matter concludes by saying that he had made the charge against me as to the ingots "on which however," says he "I do not lay any great force, unless it may be shown that the ingots being bad he has refused to amend them."

Letter #13

John Leonard Riddell to Hon. Levi Woodbury, Secretary of the Treasury, July 18, 1840.

Sir,

On the 15th inst I mailed you my reply to charges preferred against me – with accompanying documents. Ere this reaches you, I trust you will have received that.

I take the liberty of inclosing a copy of a letter from Dr. E. H. Barton to the Director of the Mint, on the subject of the McCarthy Outrage. Permit me to add that Dr. Barton, late professor of the theory and practice of medicine, stands in this city at the head of his profession. No one is more generally and deservedly respected.

With great respect I
subscribe myself
Your obt Servt
J.L.Riddell

Notation: Send this with other papers to the Director. W.

Letter #14

R. M. Patterson, Director of the United States Mint, to Hon. Levi Woodbury, Secretary of the Treasury, July 27, 1840.

Sir,

I have the honor to acknowledge the receipt of your letter of the 25th inst transmitting a communication from Dr. J. L. Riddell, in reply to, and explanation of, the charges preferred against him as Melter and Refiner of the Branch Mint at New Orleans, together with the documents which accompanied it.

I have given careful attention to these documents, as well as to other communications received by me on the same subject; and I proceed to communicate to you the impressions left on my mind.

First, as to the attack made on MacCarthy, though I still think it most improper and ill-advised, I must acknowledge that the provocation was very great, and Dr. Riddell's letter to me of the 28th of June, presents a feature in this quarrel unknown to me before, and which is calculated to soften the judgment as to his course. I allude to a slander uttered by MacCarthy against Dr. Riddell, which was of an exclusively personal character (unconnected with the Mint) and which was no doubt as false as it was infamous.

As to the gold ingots, I have to remark that the details of the trials made on them by the Coiner can lead to no other conclusion than that they were not of a proper degree of ductility and it now appears that Dr. Riddell was, in fact, not aware of the difficulty of making the alloys of gold ductile, and was not acquainted with the process to be followed for this purpose. I had supposed that all our former instructions were on file at the New Orleans Mint, but it seems that this is not the case.

The omission, in the present case, has been already supplied, in a manner which I presume to be sufficient, but a copy of the original instructions shall also be sent.

With Dr. Riddell's reasons for the discharge of his men I have been made acquainted by the Superintendent, and I think that they were satisfactory.

It is a great misfortune to the New Orleans Mint, that the Melter and the Coiner should be on terms of misunderstanding. Mr. Tyler is probably not blameless in this matter, but neither, certainly is Dr. Riddell, whose course shows too much of an unconciliating disposition. Mr. Cammack says of him — "he has not succeeded in preserving in the Mint that harmony and good feeling so much to be desired, and without which its operations must be retarded and the situation of the other officers rendered unpleasant." Mr. Kennedy, in his letter to Dr. Riddell, of the 9th inst, says "I cannot omit the opportunity now offered of renewing to you, the expressions of the deep regret I experience, at the misunderstanding which has existed for some time between you and Mr. Tyler. The question appears to have grown into one of qualifications or skill, in which the pride of each is exclusively involved. Hence each one of you, in the full conviction that he is thoroughly acquainted with his own business, is unwilling to listen to any thing from the other in the way of suggestion. This is a state of things to which I can foresee no end, so long as we have any metal either to melt or coin, unless a feeling which, with us all, should be stronger than any other, to wit, a desire for harmony and peace throughout the establishment, should bring about between you a better understanding founded upon a spirit of mutual concession." With such proper views entertained by the officer who has the immediate control of the New Orleans Mint, with the knowledge that disputes among the officers brought that Mint, but a short time ago, to the verge of ruin — and has now given rise to so much trouble and confusion as to be one of the causes requiring the interference of the government, I hope that a better spirit will be cherished among them for the future, and that this source of complaint may be removed.

On the whole, though the evidence shows that there has been want of prudence and sound judgment in Dr. Riddell's course, I do not think that there remains sufficient cause for any further action in this case, on the part of the government.

Very respectfully,
Your faithful servant,
R. M. Patterson
Director

PS I return you all the papers as you desire.

Letter #15

R. M. Patterson, Director of the United States Mint, to Hon. Levi Woodbury, Secretary of the Treasury. July 29, 1840. Marked "Confidential".

Sir,

I have the honor to acknowledge the receipt of your letter of the 27th inst.

I had received Dr. E. H. Barton's letter, and had answered it. His defence of an appeal to muscular force in support of moral and official integrity may receive favor among certain portions of the community with which he associates, and may be dignified by the name of public opinion, but such conduct is not the less a moral deformity, and will never receive my approbation, or I am sure I may add, yours. The slander to which I alluded in my communication to you sent yesterday (and which I would not repeat in a public document) was an assertion by Dr. MacCarthy that Dr. Riddell had been the murderer of his wife, who died not long since at the Mint. For so gross a personal offence, a man may be driven to take personal *vengeance,* and I should not be disposed to pass heavy judgment upon his conduct. I should not be so absurd, however, as to think he has raised his *character* by it.

Mr. Kennedy, in a letter of the 12th inst., writes as follows:

> "Mr. Tyler, I am happy to inform you, has been able to work about $8000 of the last melt of gold. Dr. Riddell requests me to say that the process followed by you in the preparation of gold, and which was explained, in your words, in a communication formerly sent to this mint, has never come to his hands. He has taken a copy of the general view of it which you have given me in yours of the 27th ult., I trust we shall now get along better."

The first part of this extract requires explanation, for which I shall ask. Neither the language nor the amount would lead me to think that the whole melt was rolled. The quantity would make about a third or a fourth part of one of our melts. Was the remainder unfit for rolling? This could only happen from bad casting, but with inexperienced hands it may have occurred. When casting quarter eagle ingots we have generally to interrupt the operation in the midst, to cover the pot, and give a greater heat to the metal. If this be neglected, the ingots will be spoiled. Besides, it may be possible to roll ingots, by small degrees and frequent annealing, which a coiner might, notwithstanding, be justified in rejecting.

The last part of the extract convinces me that the melter was not acquainted with the process to be followed, in order to make ductile alloys of gold. In one of his letters he asserts that the gold must have been ductile because the ingots were made of fine gold obtained from the process of parting. Nothing can be more fallacious than this inference. If perfectly ductile fine gold be melted down with perfectly ductile copper in the proportion necessary to bring it to our standard, the ingots thus formed will always be found brittle — sometimes exceedingly so. This is one of the mysteries of the art, which I am unable to explain and of which Dr. Riddell seems to have been ignorant. — I take the liberty of sending herewith a copy of my letter to Mr. Kennedy of the 27th ult. a perusal of which will show you how naturally all Dr. Riddell's difficulties as to the ingots may have arisen.

As to the question of Mr. Tyler's competence and fidelity, I must refer you to my letter of the 21st of March and 22nd of April, the latter enclosing a letter from Mr. Kennedy, and a note from Mr. Cammack. I hear that Mr. Tyler has inherited from his brother the enmity of some individuals connected with the former regime of the New Orleans Mint, and that they are using their exertions to injure him, without just and sufficient cause. Mr. Tyler and Dr. Riddell are both deficient in experience, but they have the general knowledge of their respective departments, and the requisite talent, to make them good officers, if they can only be encouraged to cooperate together in peace. I have urged it upon Mr. Kennedy to use every exertion to bring about this most desirable end.

Very respectfully,
Your faithful servant,
R.M.Patterson

Notation on letter:

M 33 July 30 Secretary.
Check and return this to me for the Rdt. W.

Letter #16

John Leonard Riddell to Hon. Thomas Ewing, Secretary of the Treasury. April 8th, 1841.

Sir,

Aware as I am how completely your time must be absorbed in important matters, I would not obtrude myself upon you had I not observed this morning in one of our less respectable city papers, an article wherein I was mentioned among others as being obnoxious to Mr. Webster's late circular. – falsely charging me with having been an active partisan during the late Presidential election, and having influenced the votes of the men engaged in my department.

In regard to my having been an active political partisan you will excuse me for informing you that my attention has heretofore for years been wholly devoted to chemistry, botany and geology, without paying the least attention to politics. In the fall of 1839, while absent from the country, unsolicited by and unknown to me, the office of melter and refiner in the New Orleans Mint, was conferred upon me by Mr. VanBuren, at the instance of my fellow proffessors in the Medical College of Louisiana; they supposing me peculiarly qualified for its duties. I have never since, as a rigid investigation would prove, sought to influence the vote of any one in the elections. As to the men employed in my department I never inquired how they intended to vote, nor whether they voted at all. I never knew the political sentiments of any of them but my foreman who is a warm whig. At the instance of a friend on one occasion last summer, I was present at a small ward meeting of some 20 persons, the only political meeting I have attended since holding this office. Even then I made no expression of sentiments, public or private, for the matters in contest were foreign to my usual train of inquiries.

Having reason to believe that there may be applicants for the office I hold, who, though unqualified, are nevertheless willing to hazard the interests of government in undertaking the difficult and responsible business of melting and refining precious metals, I have deemed it a duty both to myself and the government to address you. Since accepting this office it has required my whole attention and study to quality myself for the satisfactory discharge of its duties, which, frankly, I found impracticable along at first. My men, at first inexperienced, are now progressively becoming better trained, and I am habitually finding occasions for making improvements in the mode and economy of the operations. In short, I now feel confident in being hereafter able to conduct the department under my charge to your entire satisfaction.

Being unknown to you, I take the liberty of sending you, as corroborative of some of my statements, sundry papers on the botany and geology of Ohio, researches made by me while residing in that State.

Allow me to add in conclusion, that as in accepting and devoting myself to the post I hold, I have necessarily got somewhat out of my former round of pursuits yielding a livelihood, especially the cultivation of natural history, and the accomplishing of mineral surveys, I will thank you to communicate to me at the earliest day permissable, the intentions of the President in respect to this office, in order that, if to be displaced I may secure favorable opportunity for making arrangements for the future.

Respectfully,
Your Obedient
Servant
J.L.Riddell
Melter and Refiner

Letter #17

Silas Reed to Hon. Thomas Ewing, Secretary of the Treasury. April 29, 1841.

Sir,

If you have no conclusive evidence that Doct J L Riddell, present refiner at the U S Mint at N.O. has been a political partizan and in that way prostituted the official trust reposed in him, I hope he will be continued in office. He is a gentleman of high literary and scientific attainments – of good moral character, and a business, industrious man. In point of qualification, industry and integrity, I apprehend no one in his superior. I knew him several years in Cincinnati – and his name in honorably connected with the botany, geology and mineralogy of the West.

I have the honor to be
With high regard
Your Obt Servt
Silas Reed

Letter #18

John Leonard Riddell to J. M. Kennedy, Superintendent, United States Branch Mint, New Orleans, La. May 21, 1841.

Sir,

The employment of slave labor in the melting department of this Mint has, for a considerable time, been a subject of reflection with me, and I am convinced that its partial introduction is practicable and would be attended with good results.

The following are some of the reasons as they present themselves to my mind in favor of employing slaves:—

I have in my department five hands, viz:— two foremen and three laborers. These three laborers are employed in carrying coal, tending furnaces, cleaning out ash pits, cleaning and handling moulds, lifting pots from furnaces, sweeping, filing ingots, etc. services which could at all times be just as well performed by blacks as by whites, and in the hot months of the summer much better, since Creole blacks can stand heat in this climate, or endure to work over hot furnaces far better than whites. White workmen may generally wish to leave during the summer, which if it does not wholly suspend, surely cripples the operations of the mint.

By permitting the employment of three slaves the government would save $20 a month on each, equal to $60 on the three or $720 a year, since, besides a deduction from present prices of $15 on the monthly wages of each it would be unnecessary to allow pay for their overtime.

By this means the custody of the bullion in process of melting or refining would be rendered perfectly safe, which I cannot consider it now, and this consideration with me is paramount to all others. Thus: a rigid police might be easily maintained over slaves, which would prevent the possiblity of robbery. The clothing of the slaves could be purposely simple and without pockets. They should never leave certain circumscribed premises until the closing of work at night, when their clothes should be changed in a room previously locked, in the presence of a foreman. All this would be impracticable with white laborers. They will not submit to these restrictions, nor is it to be asked of them. At present I have to trust to the honesty of my men, which I have it is true no special reason to doubt, yet day by day for weeks they might carry off bullion almost unsespected and thus involve me in ruin. Knowing this possibility I confess I am very often I may say almost incessantly annoyed by uneasy, though I hope groundless, apprehensions.

I am informed that for some time past the melter and refiner of the Dahlonega Mint has employed slaves as laborers.

In conclusion the pith of the matter may be laid bare in few words: By availing ourselves of slave labor in the melting department

1st We should almost do away with the danger of suspension in the summer on account of unhealthiness of the climate as occasioning the sickness or emigration of the laborers.

2nd We should annually save $720 in pay for laborers.

3rd and last, by placing these slaves under the control of a vigilant and confidential foreman my mind would be set at ease as regards the robbery of bullion, by almost preventing as I conceive the possibility of its occurrence.

I subscribe myself
respectfully
your obedient servant
J L Riddell
Melter and Refiner

Letter #19

John Leonard Riddell to John Tyler, President of the United States. November 6, 1841.

Sir,

Having had the honor and pleasure of becoming slightly known to you, while journeying westward from Washington City a year since, I am encouraged to address you at this time.

I have reason to believe that an attempt has been or will be made to prejudice my standing with you; for no other real reason than that I have disobliged some of my late friends by refusing to loan money: — but for the falsely alleged reason that I have not made a satisfactory settlement of my silver account.

There is it is true a difference of opinion between the superintendent of this mint and myself, respecting one item which in accordance with our regulations I offer: — viz, an estimate of nearly eight tons of sweep, or precious metal in ashes, etc. I wishing to save myself from loss by extracting the silver from it at this mint, which, having prepared myself, I pledge myself to do by the time of our annual settlement, the 1st of January; the superintendent on the other hand, refusing for the present to receive the assayer's certificate of its net value in settlement (1654 7/100 ounces of standard silver, near $1800, its gross or real value being near $3000) and wishing to have it sold at once to smelters abroad and the market value or nett proceeds (1654 7/100 oz) carried to my credit when received; by which, though the account would be closed, I would sustain a personal loss of more than $1000, of silver coins already advanced by in settlement. The whole matter is now before the Director, Dr. Patterson, at Philadelphia.

Should charges or complaints worthy of your notice from any source be preferred, I would surely ask an opportunity of being fairly heard in defence; and this I feel assured you will grant me.

I have the honor to be
with respect
your obt and humble
servant
J L Riddell
Melter and Refiner

Letter #20

From Robert J. Walker, Secretary of the Treasury, to John Leonard Riddell, December 4, 1848.

J. L. Riddell, Esq.

I am directed by the President of the United States to inform you that your services are no longer required as melter and refiner in the Branch

of the Mint of the United States at N.Orleans and that you are removed from that office.

Very respectfully,
Your obt Servt
R.J.W.
Secretary of the Treasury

Letter #21

From Robert J. Walker, Secretary of the Treasury, to Joseph M. Kennedy, Superintendent, Branch Mint, New Orleans, La., December 4, 1848.

Sir,

You will deliver to Mr. Riddell the inclosed letter and take care that the duties of the melter and refiner are no longer performed by him.

It is expected that this office will be filled in a few days by a new appointment, and in the mean time you will take such steps as will prevent any injury to the public interest.

Very respectfully,
Your obt servt
R.J.W.
Secretary of the Treasury

Letter #22

Washington and New Orleans
Telegraph Line

(murphy Print)

The following Communication was received at Washington 20th 11 o'clock 0 min p.m. dated New Orleans 20th 9 o'clock 20 min. P.M. for Hon Jeff Davis.

Professor J L Riddell competent and responsible, will accept our mint treasuryship. Please telegraph me where it is too late to forward recommendations.

Geo. Dunlap

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The Riddell Mint Correspondence

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I. Appendix Material

1. May 28, 1840 Robert M. Patterson to Joseph M. Kennedy.
2. June 13, 1840. Robert M. Patterson to Joseph M. Kennedy.
3. June 13, 1840. JLR to Levi Woodbury.
4. June 16, 1840. Robert M. Patterson to Joseph M. Kennedy.
5. June 6, 1840. Joseph M. Kennedy to Robert M. Patterson.
6. June 18, 1840. Robert M. Patterson to Joseph M. Kennedy.
7. June 19, 1840. Robert M. Patterson to Levi Woodbury.
8. June 20, 1840. Robert M. Patterson to Levi Woodbury.
9. June 27, 1840. Robert M. Patterson to Joseph M. Kennedy.
10. June 18, 1840. JLR to Martin VanBuren.
11. June 24, 1840. Levi Woodbury to JLR.
12. July 14, 1840. JLR to Levi Woodbury.

A. JLR to Joseph M. Kennedy, April 20, 1840.
B. JLR to Joseph M. Kennedy, April 23, 1840.
C. JLR to Joseph M. Kennedy, June 9, 1840.
D. JLR to Joseph M. Kennedy, June 18, 1840.
E. Joseph M. Kennedy to JLR, June 19, 1840.
F. Joseph M. Kennedy to JLR, June 26, 1840.
G. JLR to Joseph M. Kennedy, June 26, 1840.
H. Joseph M. Kennedy to JLR, July 2, 1840.
I-1. JLR to Joseph M. Kennedy, July 7, 1840.
I. Joseph M. Kennedy to JLR, July 9, 1840.
J. JLR to Joseph M. Kennedy, July 11, 1840.
K. Joseph M. Kennedy to JLR, July 11, 1840.
L. Working of gold ingots.
M. Explanation of the cause of the coiner's failure in rolling gold ingots.
N. Philos B. Tyler to Joseph M. Kennedy, June 23, 1840.
O. JLR to William P. Hort, July 9, 1840.
P. William P. Hort to JLR, July 9, 1840.
Q. JLR to Philos B. Tyler, June 23, 1840.
Q-2. Philos B. Tyler to JLR, June 23, 1840.
Q-3. JLR to Philos B. Tyler, June 24, 1840.
Q-4. Philos B. Tyler to JLR, June 24, 1840.
Q-5. JLR to Philos B. Tyler, June 25, 1840.
Q-6. Philos B. Tyler to JLR, June 25, 1840.
Q-7. JLR to Philos B. Tyler, June 25, 1840.
Q-8. Philos B. Tyler to JLR, June 25, 1840.
R. James Jones to JLR, July 8, 1840.
S. JLR to Robert M. Patterson, June 28, 1840.
T. JLR to J. Bertrand, July 10, 1840.
U. J. Bertrand to JLR, July 13, 1840.
V. JLR to Joseph M. Kennedy, June 22, 1840.
W. JLR to Robert M. Patterson, June 8, 1840.
13. July 18, 1840. JLR to Levi Woodbury.
14. July 28, 1840. Robert M. Patterson to Levi Woodbury.
15. July 29, 1840. Robert M. Patterson to Levi Woodbury.
16. April 8, 1841. JLR to Thomas Ewing.
17. April 29, 1841. Silas Reed to Thomas Ewing.
18. May 21, 1841. JLR to Joseph M. Kennedy.
19. November 6, 1841. JLR to John Tyler.
20. December 4, 1848. Robert J. Walker to JLR.
21. December 4, 1848. Robert J. Walker to Joseph M. Kennedy.
22. George Dunlap to Jefferson Davis. (Telegram).

II. Used in Text

1. July 17, 1840. Edward Hall Barton to Robert M. Patterson.
2. June 24, 1840. Levi Woodbury to JLR.
3. March 31, 1849. JLR to William M. Meredith.
4. March 29, 1849. Gustavus A. Nott to William M. Meredith.

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