

Apollinaris spring : decision of the United States Treasury dated 28th January 1882 and report of Colonel Tichenor, special European agent of the United States Treasury dated 31st August 1881 / [Charles J. Folger, Geo C. Tichenor].

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Apollinaris Spring

DECISION OF THE UNITED STATES TREASURY

DATED 28th JANUARY 1882

AND

REPORT OF COLONEL TICHENOR

SPECIAL EUROPEAN AGENT OF THE UNITED STATES TREASURY

DATED 31st AUGUST 1881

REGISTERED



TRADE MARK

Reprinted from Official Publications of the United States Treasury

Mr L. Davies

Printers

SPOTTISWOODE & CO., NEW-STREET SQUARE, LONDON

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In the Matter of the Apollinaris Mineral Water.

THERE is in Prussia a spring of water known as the Apollinaris Spring, from it flows a natural water. This water is a legitimate subject of commerce, and it may be imported into the United States free of duty. There is no doubt that water from that spring has been and is imported into the United States, and an importation of it gives rise to this case.

Why should it not come in free of duty? It is claimed that it is not, when it reaches here, the same as is produced by the spring. It is beyond dispute that, to transport it from the spring, it must be put into vessels of some kind that can be made air-tight, as bottles and jugs. Hence there must be a manipulation of it, and any manipulation that serves to confine it is allowable, and in itself does not change the character of the water or render it an artificial product, for wheat in bags, or crude petroleum in barrels, is still a natural product.

But it is said that in the manipulation there has been added to it two things, and taken from it one.

It is claimed that there has been taken from it iron.

One of the chemists, on whose report they rely who assail the genuineness of the imported water, concedes that the quantity of iron ever in it is so small that the presence thereof in, or the absence thereof from, the water will make no difference in the quality of it. And the conclusions of other chemists agree with his.

Besides the report of the Special Agent, Tichenor, is that, as matter of fact, the iron ever in it is not taken from it. This allegation against the water is not sustained.

It is said there is added to it salt.

The quantity added is not great. Some is added. The question is, does it change the properties and character of the water? Is it added for that purpose? Or is it added to preserve the water in the state in which it is bottled or jugged, and without the purpose or effect to change its character or properties?

I must say that the facts of the case show that, by the addition of the salt, the taste of it is not changed; that the properties and

character of it are not changed from what they were in the spring, and that it is not the purpose to make any change by putting in the salt ; and that the purpose is the same as that of putting the water in air-tight vessels, namely, to keep it in the state in which it is procured from the earth for a length of time, long enough to permit transportation to other countries.

It is claimed that there is put into it carbonic acid gas in greater proportion than that gas exists in it in nature. I do not think this is maintained.

The allegation depends much upon speculation. When it leaves speculation it depends upon whence the water is got with which to make analyses. It may be conceded that if the water is taken from the lip of the spring, there is to be found in it, on analysis, less of that gas than is found in it when taken from the bottles or jugs. But the water that is put into the bottles or jugs is not taken from the lip of the spring. It is taken from down in the spring fifty feet or so. The facts show that at that depth there may be, and doubtless is, as much of that gas in the water while it is in the spring as is found in the water from the bottles or jugs.

But it is claimed that the water of nature is the water just where nature hands it to man, that is, at the brink of the spring. I cannot agree to that.

Is not the water at the bottom of a well sixty feet deep as much natural water as water in a creek but a few inches deep ?

Coal or other mineral taken from the depths of the earth is a production of nature. If the water is drawn from the depths of the spring into the vessels it is natural water, though it have in it more of one ingredient than is found in it when taken from the surface of the spring.

The more serious question arises from the manner of manipulation of the water and the gas. The water is taken from the spring by one means, the gas separately by another, though not unlike means, and the two ingredients are afterwards combined. It is claimed that more of the gas is put into the water when it is bottled than ever was in it at any depth of the spring. This is not sustained, and the only question is whether, with no greater quantity or proportion of an ingredient than existed in the water at some depth of the spring, the separation of the ingredients first, and the combination of them after in the original proportions, is the creation of an artificial water ?

The effect of the decision in *Recknagel v. Murphy* (102 U. S. Rep. 198) is, that when the identity of a subject is not lost by the process it has undergone before importation, it does not cease to be the original article.

The question then becomes one of fact. Was the identity of the water lost by the separation, first of the water and the gas, and by the combination of them afterwards? If the subsequent combination made again the same article that existed before separation, the identity of that article is not lost. The blade and the handle of a sabre may be disconnected, and then one is a blade and the other is a handle. If afterwards they, unaltered, are joined together, the two become again one thing, and that thing is a sabre—the same sabre. Were it possible to disintegrate coal, and separate the gases in it from the tangible substances, and then again to reunite them in the same proportions and distributions, the result would again be coal, and the same coal.

Now the reports in this case show that such is the result of what is done with this water.

It is claimed that the gas is collected not only from the spring itself, but from the space about and outside of it. I do not find that this allegation is sustained. It appears to me from the papers that no more is taken and stored, and afterwards recombined with the water, than is the natural product of the spring evolved from the surface of it; so that if all that is thus caught is put back into a quantity of water no greater and no less than that from which the gas escaped in the rise of the water to the air, and is put back with equal distribution through the water, it follows that there is the same thing reproduced that before existed as a natural flow from the depths of the earth. And that this is so seems to me to be the result of the investigations of the agents.

I conclude, therefore, that the water imported under the name of Apollinaris Water is an article which is produced by nature, and is not the handiwork of man; that it is a natural, and not an artificial water.

I will, therefore, adhere to the former decisions of this Department, that that water be admitted free of duty.

(Signed) CHARLES J. FOLGER,
Secretary of the Treasury, U.S.A.

LONDON, ENGLAND,
August 31, 1881.

SIR,—I have respectfully to state that, prior to my departure from the United States, I was informed and given to understand that as a result of inquiries completed and in progress at the port of New York relative to the article commercially known as 'Apollinaris natural mineral water,' the department would probably be called upon again to consider and decide whether the same was a natural or artificial water, under the law, and in consequence I would be expected or directed to give the subject my attention at an early day after my arrival in Europe.

Acting upon instructions received on the 30th ultimo, I left London on the 10th instant, and proceeded *viâ* Cologne and Remagen to Neuenahr, arriving at the latter place on the evening of the 12th instant.

Having in mind that it had been represented and intimated to me in the United States that the carbonic acid contained in the Apollinaris water was artificially prepared, and that the water itself, as exported to the United States, was largely obtained from the river Ahr, instead of from a spring, I determined, prior to visiting the Apollinaris spring and making myself known, to devote the time to a thorough inspection of the surroundings of the spring and works, to gathering information from persons in Neuenahr and the other neighbouring towns and villages, and generally to obtaining all possible facts, information, and evidence from outside sources.

I addressed myself quite industriously to the line of inquiry stated from the afternoon of the 12th to the morning of the 15th instant.

Finding a vessel at the wharf at Remagen loading with bottled Apollinaris water—which was being brought in waggons from the spring—I observed to see whether any packages were discharged from the vessel which appeared to contain sulphuric acid or other materials used in the preparation of artificial carbonic acid, scrutinising also the waggons returning to the spring. I traversed the banks and examined the little tributaries and drains of the river Ahr opposite to and for long distances above and below the 'Apollinaris-Brunnen,' eagerly searching for evidence that its waters were utilised for bottling by the Apollinaris Company. I visited

and inspected the springs at Neuenahr and the Landskron and Heppingen 'brunnens,' near by, noting with care their location and surroundings and the taste and appearance of their waters. I passed around and about the works at the 'Apollinaris-Brunnen,' scrutinising most carefully all the surroundings and minutely searching for evidences of the artificial production of carbonic acid. Finally, *and after having failed to obtain any proof whatever* of the preparation or use of artificial carbonic acid, or of the use of water from the Ahr, I, on the morning of the 15th instant, presented myself at the 'Apollinaris-Brunnen,' and having informed the representative of the Apollinaris Company at the works of my official character and object, was informed by him that his instructions utterly forbade him allowing any person not connected therewith access to the spring and works, but that he would immediately communicate with the president and general manager of the company at London, who he expected would arrive on the following day.

Deciding to await this gentleman's arrival, and desiring to utilise the intervening time, I proceeded to Niederselter, in Nassau, and visited the 'Royal Selters Brunnen,' owned and managed by the Prussian Government, and from which large quantities of water are exported to the United States. I had been informed that there was reason to believe that some of this water was artificially charged with carbonic acid.

I was admitted within the walls inclosing the spring and works but learned at once that the day was being observed as a church holiday in Nassau, and in consequence operations were suspended at the works. The gentleman in attendance, not understanding the English language, and not being able to converse with him in his own tongue, he did not appear to understand or appreciate the object of my visit, but contented himself with merely showing me the spring and allowing me to examine it and to taste its waters, without evincing the least inclination towards allowing me to inspect the premises and works, which cover a large area of ground, include a number of large and substantial buildings, and on the whole appear about as formidable as the 'Apollinaris-Brunnen.'

The spring itself, as shown to me, is situated in a sunken circular stone-walled and paved covered court, and is inclosed in a cone-shaped hood or cover of glass, through which the water can be seen whirling and bubbling a short distance below. A few feet

distant is a sunken space, reached by stone steps, along one side of which a pipe is fitted horizontally *some distance below the spring's surface and outflow*, into which the water is conducted or forced, *under pressure*, and from which, by means of faucets arranged at intervals, it is carried into the jugs. The process was exemplified by a number of villagers being permitted to fill jugs, for their private use, during my stay.

Having read and been told that the Selters water was 'dipped from the spring' into the stone jugs, in which it is exported to the United States, I was astonished to find the means employed as above described. Having also understood that this water was sold only in stone jugs, I was surprised to see large quantities of empty *bottles* stacked up about the premises. These I conclude, of course, are used in bottling the water, and may have been resorted to recently as a more effective means of securing to the water a greater amount of carbonic acid than is practicable in the jugs. I have no direct information, however, on this point. I have been unable to learn thus far, however, whether the bottled water contains more carbonic acid than is contained in the jugs, and in order that no erroneous impression may obtain in case it shall be found that this water as exported to the United States in *bottles* contains more carbonic acid than is contained in that in *jugs*, I deem it proper to state that there is no question but that the water as it exists in the depth of the Selters spring contains far more carbonic acid than is contained in the jugs filled according to the process I have described, and that I am also satisfied that it is impracticable to secure as much carbonic acid in the water in stone jugs as *can* be secured in water in glass bottles.

Since my visit to the Niederselters spring I have been furnished one of a series of publications of Professor Fresenius, the scientific adviser of the Prussian Government on its springs, published in 1868, which I enclose herewith, marked A.

As translated to me, the author states that his connection with the Nassau springs began in 1845 (long before the Apollinaris spring was discovered). In speaking of the Niederselters water, he says that, in the process of bottling, this water unavoidably absorbs a quantity of atmospheric air, the oxygen of which, combining with the oxydul of iron in the water, forms oxide of iron, which, when the water is bottled, precipitates in the bottle, or jug, and after some time firmly adheres to the inner surface of the vessel. (See page 254.)

At the time when he (Fresenius) took charge of the Selters spring, its water (according to Kastner's analysis, which is nearest to the time, 1845) contained in 10,000 parts, 0.102 of oxydul of iron (the Apollinaris contains 0.068).

In describing the method of filling at the Selters spring, Prof. Fresenius (according to translation supplied me) remarks, on pages 278, &c., as follows :—

The jugs were placed into an iron tray which, by means of an iron chain, was sunk into the spring and filled. This method had the advantage of doing in the shortest possible time a great amount of work, but it had many disadvantages, which I classify under four heads.

(a) The constant violent agitation of the spring by sinking and raising the iron tray had necessarily an injurious influence upon the different streamlets which, deeper in the earth, formed the spring and in which the sinking and raising of the tray necessarily, in response thereto, produced alternately a pressure and relief upon and to them, and to which I ascribed the temporary cloudiness of the spring's water.

(b) Dipping the jugs into the spring necessitated its being open continually, and not only allowed impurities, such as dust, &c., to get into the water, but the jugs themselves often carried organic substances adhering to their sides into the water, which, when this water had flowed into the jugs, produced decomposition.

(c) This agitation of the spring carried into its water a considerable quantity of atmospheric air which was increased by the quantity of air which the empty jugs contained, and which in the process of filling they gave forth, it being replaced by the water. The natural consequence of this introduction of atmospheric air was to set a considerable amount of the water's carbonic acid free, which then most readily escaped.

(d) The atmospheric air entering into the spring, as above described, produced in the latter a constant and therefore excessive formation of oxide of iron.

In consequence of my representations that this method of filling caused a considerable loss of carbonic acid it was abandoned, and in 1846 the new method, which is still in use, was adopted, and which is as follows: The spring itself is completely covered up at the top, and has, some distance below it, a lateral outflow to carry off the surplus water. Twelve and a half inches below this outflow there is another pipe which leads down to a supply pipe, not far distant from the spring, to which eight taps are attached, by means of which four labourers are able to fill simultaneously eight jugs. By this means all the disadvantages of the old method, enumerated under *a* to *d*, were removed, and the quantity of gas secured in the water was increased. The various experiments to ascertain this increase differ in their results and show as much as 16 per cent. increase.

In speaking of the quantity of carbonic acid in the jugs I would make the following observations: The water loses carbonic acid (*a*) in consequence of the mechanical movement of the water when it streams into the jug; (*b*) in consequence of the air which flows with the water into the jug, which therein frees itself of the water, and in doing so drives out carbonic acid; and (*c*) in consequence of the time which elapses until the jugs are corked, and during which time, when the water is under the ordinary atmospheric pressure, it has cause, and finds means, to give off a part of the carbonic acid with which, under a higher pressure, it had been saturated.

From my own experience I can attest that the Selters water, if filled without

impurities, and if properly stored, keeps a considerable time. I have not discovered a foul smell, *i.e.*, sulphuretted hydrogen, except when foreign organic substances (straw, dust, with organic substances, cork, dust, &c.) got into the water. They will, after acting for a considerable length of time upon the sulphate of soda, produce sulphurous constituents, which, in consequence of the carbonic acid, give off sulphuretted hydrogen.

The water which has been for a length of time in a jug has its oxydul of iron converted into oxide of iron, in consequence of the air which flows with the water into the jug, and the air which is left in the topmost empty part of the jug. This oxide of iron adheres to the inner sides of the jug, and does not flow out with the water, and in my opinion this is no disadvantage to the water, which thereby is free of its oxydul of iron.

He (Professor Fresenius) closes by suggesting that to meet the requirements of the age and the different tastes of the different consumers, some of the Selters water might be additionally supersaturated with pure carbonic acid, and in all probability this suggestion would have been (if it has not been) acted upon if the Niederselters spring contained a sufficient supply of carbonic acid. The opinion that, by such addition, the water might be altered in its character is conspicuous by its absence.

On page 7 of the foregoing I have, for reasons hereafter apparent, alluded in parenthesis to the Apollinaris spring, to which I now return.

Mr. Edward Steinkopff, manager of the Apollinaris spring, having arrived from London, he invited me to join him in an inspection of the Neuenahr springs, and to accompany him on a visit to the springs at Schwalbach and Wiesbaden, and to any others I might name. These invitations were accepted, and we proceeded at once to inspect the Neuenahr springs. These consist of four small springs or 'fountains,' called respectively the 'Marien Sprudel,' the 'Augusta,' the 'Victoria,' and the 'Little Sprudel,' and of 'The Sprudel,' the latter being the main spring or source upon which the others are dependent. This spring is about one English mile west from the Apollinaris, upon somewhat higher ground, on the opposite side of the river Ahr. It is ranked quite prominently in the books amongst those known as 'alkaline acidulated springs,' being reputed as well endowed with bicarbonate of soda, and quite pregnant with carbonic acid. It is located in a large walled court, some 12 feet below the earth's surface, being held in a stone basin 12 feet in diameter, which, on account of the constant violent agitation of the water—caused by the exhalations of gas—presented the appearance of an enormous kettle of boiling water. Upon approaching this basin we were

instantly made aware of the presence of large quantities of carbonic acid, so dense, indeed, as to produce a powerful heating sensation from the feet to well above the knees, and to impede respiration when stooping down. It was stated to us at the spring that for a time after its discovery it was allowed to remain open to the public; but a number of accidents—especially to children—having occurred from inhaling the carbonic acid, it had since been closed.

Inclosed, marked B, is a leaf from a book relative to the Neuenahr springs, which gives the analyses of '*The Sprudel*' (big spring), and refers specially to its carbonic acid.

Both Drs. Sutro and Braun, well-known authorities in balneology, in their works on the springs of Germany, published in 1865 and 1875 respectively, mention the richness of these springs in carbonic acid gas.

In publications made many years ago relative to the Neuenahr springs, the circumstances and incidents of their discovery are related substantially as follows:—

Prior to the fifteenth century a mineral spring had been found at Heppingen, not far below the earth's surface, the water from which, by reason of its sanative qualities, became a valued article of commerce. Subsequently a spring was discovered at Landskron, near by, and finally in 1851 the Apollinaris spring was discovered by chance. As shown by the inclosed map, marked C, Heppingen is east about three miles from Neuenahr, in the Ahr Valley, and, being nearer the confluence of the river Ahr (which falls rapidly in its course) with the Rhine, is very much lower. The existence of the Heppingen and Landskron springs and low temperature of their waters, and the discovery of the Apollinaris spring, so near to, but west of and higher than these, and its comparative temperature (20° Cent.), led to the conclusion that by going still further west and higher the main source of these springs would be found. In carrying out this idea, Professor Bischof, of Bonn, and his son, Dr. Carl Bischof, made geological researches, which led them to the place where now the '*Sprudel*,' or '*Big Spring*,' exists. While exploring here their borer broke and could not be got out. They then undertook to dig in easier places near by, which led to the discovery of the spring fountains '*Augusta*' and '*Victoria*.' Shortly afterward a private gentleman, in digging but a few yards from these, found a third spring, which was called the '*Marien Sprudel*.' The effect of opening the '*Marien Sprudel*'

was to weaken the 'Augusta' and 'Victoria' springs, and lower the temperature of their waters so much that it was found necessary to search for another spring, which led to the discovery of what is called the 'Little Spring,' which, not meeting the expectations, they continued their researches, which finally resulted in the discovery of '*The Sprudel*,' or 'Big Spring' (about 30 feet from the 'Marien Sprudel'), the incidents attending the opening of which are thus described:—

This big spring, 286 feet deep, suddenly broke out on the 3rd of October, 1861, with so grand an eruption that has not had its like before, and produced such a quantity of water that the canal, which is 4 feet high by 3 feet large, could not hold it. The water soon filled the reservoir (of a diameter of 12 feet and 12 feet high) which surrounded the spring. Sand, and graywacke as big as one's fist, mixed with lava, were thrown 60 feet high. This grand spectacle lasted for two hours and then stopped suddenly, to begin with renewed force after three hours, laying everything in the neighbourhood under water.

Inclosed herewith, marked D, is a book (in German), on page 81, &c., of which fuller details of this spring are given. Also inclosed, marked E, is an old print, being an extract from a publication by Dr. Carl Waller, on the baths and spas, which is deemed of some value on account of its antiquity, and as showing the intimate relations between the Neuenahr, Apollinaris, Landskron, and Heppingen springs.

On the 17th and 18th instant we visited, in turn, the springs at Wiesbaden and Schwalbach, devoting special attention, however, only to the examination of the latter, which are owned and controlled by the Prussian Government, and from which waters are exported, in bottles, to the United States.

These (Schwalbach) springs, which have been known for centuries, are quite generously impregnated with carbonic acid, but the waters are most famous for their richness in *iron*, being the most favourite iron springs on the continent of Europe. This most valued constituent, iron, is held in solution as long as the water does not come to the surface of the spring and there mix with the oxygen of the atmospheric air. The moment the latter contact occurs, however, the oxygen combining with the iron forms oxide of iron, which precipitates, and in water, if bottled, is, as such, at the bottom of the bottle, perfectly useless, as is also the water, which, by the combination of oxygen and iron, has been deprived of the iron in solution, the only substance which gives value to the water. (See page 33, inclosure F.) I am told that in order to meet this difficulty, and to secure to the public the

water in its natural condition as it exists in the earth, the different Governments, the Grand Duchy of Nassau, and the Prussian Government, which have successively owned and controlled these springs, authorised and instructed Professor Fresenius, of Wiesbaden, their scientific adviser, to invent or discover means whereby the water could be preserved and bottled in the state in which it is found in the earth, before it has come to the outflow of the spring and come into contact with the atmospheric air. Accordingly Professor Fresenius adopted a process which is now avowedly and publicly carried on, which I witnessed and minutely observed, and which, as described on pages 54 to 56 of a volume published by the authorities at the spring (see inclosure F.), is substantially as follows, viz. :—

Every bottle which is to contain Schwalbach water is first filled with this water in the basin of the spring, and when so filled is kept immersed in the spring's water. The atmospheric air which was originally in the empty bottle has been driven out of it by the water which has taken its place. This so filled bottle is then again emptied of its contents in the basin, always keeping the bottle immersed in the water. When the bottle is now again empty it is free of atmospheric air. Its neck is then placed on the funnel of a small metallic hood, which is placed over a part of the mouth of the spring, and the bottle is then filled with carbonic acid, which escapes from the spring and finds its way through the metallic hood and its funnel into the bottle. When the bottle is thus filled with carbonic acid its mouth is taken off the funnel. The bottle is reversed, always immersed in water, and the spring's water is now again allowed to flow into the bottle. By the pressure of the inflowing water a certain additional amount of the carbonic acid is retained in the water in the bottle. When the bottle has thus been filled, it is taken out of the spring's basin and a wooden plug quickly inserted in the neck to make room for the cork. The space thus created at the mouth of the bottle fills at once with atmospheric air, to eject which *artificially prepared* carbonic acid is injected by means of an india-rubber tube connected with an ordinary generator conveniently arranged for that purpose. The last operation completed, the cork is quickly inserted and driven home. The bottle, with its contents thus obtained and secured, is duly labelled and presented for sale to the public as a *natural mineral water*. One thing which particularly impressed itself upon my mind while witnessing this process was,

that while, as before stated, this spring is quite generously endowed with carbonic acid, in approaching it no such sensations were produced, on account of the carbonic acid, as at the Neuenahr springs (and afterwards at the Apollinaris), and as the men in filling the bottles laid down with their mouths directly over and quite close to the spring, it was manifest that it gave out but little carbonic acid compared with the other springs named.

Of the different conclusions which presented themselves to my mind from the operations noted at the Schwalbach springs, I deem it proper to mention the following at this time.

First. The Prussian Government and its scientific advisers evidently believing that the value of a natural mineral water consists in its characteristic qualities, as existing when in the bowels of the earth, they think the water does not lose its name and status *as a natural mineral water* if technical means are resorted to in the bottling—the chief object in bottling of course being to preserve its characteristic quality for the use of mankind.

Second. To attain this object—the preservation of the water in its natural state—they do not hesitate to return to the water carbonic acid which it has lost, but they go farther and add *artificially prepared* carbonic acid, which the water of course never before contained.

Third. The Prussian Government and its scientific advisers, including many of the most eminent scientists in Europe, appear to think that in the use of the technical and other means stated the water does not lose its name and character, but remains simply, purely, and absolutely a *natural mineral water*. Being offered to the public as such they must regard it as such, otherwise the assumption follows that the Prussian Government is deliberately sanctioning a deception, practising a fraud, and uttering a counterfeit, or is ignorant of the facts in the case.

It is unnecessary for me to state that this water is entered and passed at our custom houses as a natural mineral water.

Respectfully submitting these facts, conclusions, &c., relative to the Schwalbach springs—to which I shall refer hereafter—I again return to the main subject of this report.

THE APOLLINARIS SPRING.

Having read and studied with much care all the reports, &c., embodied in the Department's communication to the Honourable

Fernando Wood, as printed under date February 18, 1879, and also the report of Special Agent Starring, dated February 27, 1879, as well as other documents presented me, all relating to the Apollinaris spring and water, and having in mind certain representations which had been made to me, to the effect that water from the river Ahr was bottled and artificial carbonic acid used by the Apollinaris Company, I addressed myself to the examination fully equipped with points of inquiry, and I must frankly admit with my perceptive faculties amply whetted by suspicions and beliefs adverse to the spring and to its management.

CARBONIC ACID GAS.

My first object and effort was to locate the spring, and if possible to obtain water directly from its depths in such way as to determine whether it was in fact supersaturated with *carbonic acid* (gas) as represented. I found the spring situated and surrounded precisely as described by United States Consul Bullock and Special Agent Starring; but being sceptical as to their statements relative to the superabundant exhalations of carbonic acid gas, and the danger arising therefrom, and having been told that the reported accidents on that account were 'scarecrows,' I disregarded the words of '*Caution*' conspicuously posted in the gallery overhead, and hurriedly proceeded to descend the steps leading down into the walled court or pit, where the spring is inclosed from view. Before my head had reached within 8 feet of the floor, I was confronted with exhalations of carbonic acid gas in such volume as to disturb respiration and threaten suffocation. To satisfy me that this was in fact carbonic acid gas a large roll of paper was set ablaze, and being passed down to within 10 feet of the bottom of the pit was suddenly extinguished.

Satisfied of the existence of the carbonic acid gas, my inquiries were next directed toward ascertaining whether it was *natural* or *manufactured*. I satisfied myself that it proceeded from the space between the cone-shaped hood, or drum, and its wall (described by General Starring as being contrived to receive the carbonic acid gas as it escapes from the spring), and perhaps through the crevices in the stone floor and cover of the spring. A close inspection failed to disclose any pipe or other conductor connected with this hood except the one leading from its top to the air-pump, and thence to the wrought-iron reservoirs, where the carbonic acid is stored, and which I convinced myself was used to

conduct the carbonic acid *into*, and not *from*, the reservoirs. I traced the other pipes leading to and from these reservoirs and found they communicated with the copper cylinders in which the carbonic acid gas and water are united under pressure before being bottled. I examined the other pipes connected with these copper cylinders, and found none except those which I was informed conducted the water from the spring and the tanks into these cylinders and the water and carbonic acid together from them to the bottling machines. One of these cylinders being emptied, a valve in the water pipe was turned and the water flowed in, to a certain depth, indicated by a perpendicular glass tube connected with the cylinder; then, by adjusting a stop-cock in the pipe connected with the reservoir, the carbonic acid rushed in until two and a half pressures were shown on a dial-formed manometer. Having seen the water and carbonic gas, as thus united, drawn from this cylinder and bottled, I can state that the immediate bottling process is as so well described by General Starring.

Returning to the spring, as I did repeatedly during the day, thinking perhaps to find the volume of carbonic acid either diminished or gone, I found it still there in as great quantity as at first, and utterly forbidding any closer approach to the bottom of the pit. Being concerned to know, and suspicious of the reason, why the space was left between the hood, or drum, and its wall, whereby the carbonic acid escaped so freely, I was promptly informed that it was done for the purpose of allowing the drum—which must be submerged in water—such play as would permit it to rise and fall with the water in the spring, which is ebbing and flowing more or less constantly, and occasionally quite violently. The proprietor stated that upon one occasion, during the progress of an earthquake, the water subsided so suddenly and completely as to cause alarm lest it would not return.

Determined to exhaust all means at my command—and every opportunity was afforded me—to ascertain whether carbonic acid was artificially prepared on the premises, I went from place to place throughout all the buildings, cellars, vaults, &c., immediately and remotely connected with the spring and works, carefully noting and scrutinising every place, part, ‘nook and corner,’ and minutely examining every barrel, box, or package of every form at all liable to contain materials for the manufacture of carbonic acid. Go where I might and do what I would I could find no such evidence, and yet, in the course of my passage through

the lower-closed spaces, gases, appearing to be carbonic acid, greeted me in greater or less volume everywhere. In the walled and paved vaults, or cellars—provided for the storage of bottled water in cold weather—which traverse underground long distances, hundreds of feet from the spring, I found abundant evidence that both water and carbonic acid gas are quite constantly and freely oozing from all the fissures and veins in the earth contiguous to the spring.

With these proofs (and others which I shall hereinafter mention) as to its existence confronting me, and failing to discover any evidence of its artificial preparation, I was and am forced to accept the conclusions of Consul Bullock and General Starring, and of the distinguished scientists whose views are incorporative with their reports, viz. that the carbonic acid gas used in the water as bottled and exported is a natural production emanating from the spring and consequently from the water contained therein.

Not feeling myself called upon or competent to do so, I did not undertake to determine absolutely the quantity or proportion of carbonic acid gas contained in the spring at its various depths, nor whether the water at the depth from which it is drawn—said to be 50 feet—contains more or less carbonic acid than it contains as bottled. This could not be done with any degree of certainty except by actual experiments, which, even if practicable, would manifestly be most difficult and expensive and would require the highest order of expert knowledge. By reference to Inclosure H it will be seen that Dr. Bischof reiterates his experience as related in papers in the department's possession relative to the bottle with the metallic cork, and emphasises his previous testimony relating to the supersaturation of the water with carbonic acid. Since this testimony remains unimpeached it would seem but fair to give it credence, especially since it is sustained by the concurrent views and testimony of a number of the most respectable and distinguished scientists in Europe, and derives considerable support from other sources to which I shall now refer.

Mr. Anton Kreuzberg, the managing proprietor of the spring, and who impressed me quite favourably by his earnestness of manner and apparent candour, informed me that he was present at the setting of the spring and witnessed the experiment, related by Dr. Bischof, of sinking the bottle with the metallic cork, and that the result of such experiment was most joyously hailed and freely discussed at the time. He stated that he was then con-

vinced and is now that the water at that depth contained rather more than less of carbonic acid than has since been contained in the water as bottled. He also said that he was fully persuaded that if the carbonic acid gas was used in much larger proportion there would be no diminution of its supply or danger of its exhaustion ; otherwise he would certainly have been more cautious to guard its use and escape, as, aside from considerations of a purely pecuniary character in the interests of the family estate and succession, he held it to be a sacred duty to preserve and perpetuate the spring as an enduring monument to his father who discovered it.

The contract of the Apollinaris Company with the Kreuzberg estate extends for a period of fifty years. As the value of this contract depends upon the continued supply of the carbonic acid gas in quantity sufficient for use in the proportions in which they have introduced the water to the world, it seems reasonable that if they were not well assured of its abundance and inexhaustibility they would cause means to be adopted to save the enormous quantity of this valued element which constantly escapes and goes to waste in the open court about the spring, or would curtail slightly the proportion used in bottling. That this is not done, while the waste goes on and the consumption increases, renders it manifest that *they*, at least, are abundantly satisfied that it exists in much greater proportion than they are using it or are likely to use it.

In that portion of this report relative to the Neuenahr springs the abundant existence of carbonic acid gas in their waters is shown, and the intimacy of their connection with each other and with the Apollinaris, Heppingen, and Landskron springs is mentioned. By reference to Inclosure H it will be observed that Dr. Bischof testifies to the similarity of temperature and mineral constituents of the Neuenahr and Apollinaris springs, and to their apparent affinity.

Drs. Sigismund, Sutro, and Julius Braun, in their books on the baths and springs of Germany, published in 1865 and 1875, respectively, both refer specially to the richness of the Apollinaris spring in carbonic acid. The latter (Braun), referring also to the *Heppingen* spring (in connection with the Apollinaris), says it is 'very similar in its constitution, but containing rather less carbonate of soda and carbonic acid.'

In the year 1818, Dr. Anton Vetter, then the sanitary inspector of that district, called the attention of the Prussian Government

to the mineral water which he then supposed must exist in the Ahr Valley. In his yearly report on this subject to the Government he says :—

The district, from Beul (now called Neuenahr) to Heppingen (a distance of about three English miles), is so rich in mineral water that the river Ahr, which flows through the district and which must receive the outflow of these springs, in consequence thereof never freezes even during the severest winters. The carbonic gas given forth by the mineral springs there so thoroughly permeates the whole district that it is found in cellars, and at certain times in such a quantity that a light brought into a cellar is extinguished and breathing becomes difficult and almost impossible for human beings. But [he continues] nowhere has a well been sunk to utilise this water except at Heppingen.

The agitated state of the water of the 'Big spring' at Neuenahr, and the exhalations of carbonic acid gas there and at the Apollinaris spring, undeniably prove an enormous supersaturation of their waters with carbonic acid.

At Sinzig, seven miles east from the 'Apollinaris-Brunnen,' and near the mouth of the Ahr, there was formerly a 'Spa,' the waters of which contain considerable carbonic acid.

The contiguity of this group of springs in the Ahr Valley, their apparent affinity and the existence of carbonic acid in all, certainly indicate a common origin and a very rich source in that immediate section of the earth.

As a proof of the enormous areas which are occupied in the interior of the earth by mineral springs and over which a connection of the different springs exists, it is deemed proper to recall here the historical fact that the earthquake at Lisbon on the 1st of November 1755 exercised a most pronounced although temporary effect upon the springs in Germany.

From the Eifel Mountains *viâ* Altenahr, the source of the Ahr, to Remagen, and thence along the Rhine, on either side, and across into the former Duchy of Nassau, there exist everywhere the most striking and unmistakable evidences of mighty and violent volcanic eruptions and convulsions. Throughout this region, so similar and singular in general features, there abound numberless springs of gaseous and acidulated waters, including the famous Nassau Selters, Ems, Schwalbach, Geilnau, Fachingen, Roisdorf, Apollinaris, Neuenahr, Heppingen, &c., which being more or less rich in carbonic acid proves that it exists in great abundance in that particular region of the earth; and it indicates that nature had there stored, down deep in the bowels of the earth, a vast reservoir of this element, which has been released and distributed,

through volcanic action, to be dispensed for man's use through these springs. Be this as it may, it cannot be disputed that the kinship of these springs is manifest; that they all contain carbonic acid; that a number of them contain at certain depths, according to scientific rules of calculation, as great proportion as is used in the bottled waters of the Apollinaris. Thus, while it appears that the Apollinaris spring is not alone in a rich endowment of carbonic acid, it also appears that it would be singular if it did not possess it; and because it contains *more* of it than its neighbours renders it no more singular than it would be if it contained *less* than they.

In view of the foregoing, the conclusion seems reasonable, if not inevitable, that there exists in the Apollinaris spring the amount of carbonic acid that its friends claim, and, unless it can be shown that its existence in such quantity is physically impossible and contrary to the laws of nature, I can discover no grounds for disputing such claim.

The carbonic acid being *natural*, and conceded to supersaturate the water of the spring, at the depth from which it is drawn, in as great degree as it is contained in the Apollinaris water of commerce, it only remains to be seen and determined whether the water and carbonic acid, coming *separately* from the spring's depths, may be reunited in like proportions as *they exist at such depths* in the manner and through the means pursued and employed at the spring, or whether they must be bottled in the proportions in which they exist at the spring's outflow, and without recourse to the methods and technical means employed.

In its decision of March 19, 1877, the department held that carbonic acid which has escaped from mineral waters *in the process of bottling* may be artificially restored. And in its decision of February 21, 1879, it is said that 'the Apollinaris water, as heretofore imported, is a natural mineral water, entitled to exemption from duty.'

Since the carbonic acid escapes from the water in the course of its transmission from the spring's depths, and becomes disengaged therefrom upon reaching the outflow and coming into direct contact with the atmospheric air, it is deemed reasonable to assume that the '*process of bottling*' had reference to that procedure whereby the water and carbonic acid became separated, and not to the mere process or act of *bottling the water*; hence that the department intended that the water and carbonic acid might be

reunited, at some stage in the bottling process, in the condition or proportions in which they existed in the spring's depths, and before being affected by atmospheric influence. This view appears the more reasonable since, at the date of its last decision (February 21, 1879), the department was in possession of all the facts in the case as they appear to exist at this time.

In this view of the case I would here close this branch of my report, if I was not advised that the department's rulings in the premises are being seriously controverted and tenaciously assailed as being based upon false premises, wrong in principle and contrary to law; it being claimed and contended that in order to retain its name and status as a *natural* mineral water the water must be bottled in the condition in which it is found at the spring's outflow, and without the elimination of any of its ingredients, or the restoration or change of form of any of its constituents, as existing in the spring's depths, through technical means or mechanical contrivances.

By reference to that portion of this report relating to the Schwalbach springs, it appears that the Prussian Government and its advisers not only hold to the view that a natural mineral water is a water endowed with its characteristic qualities as it exists in the *spring's depths*, or *in the bowels of the earth*, but also deem it right and proper, in order to secure and preserve it in that condition, to adopt technical means, and even resort to *artificial appliances*. It will also be seen that at the 'old and reliable' *Niederselters* the system of 'dipping' the water from the spring at its surface was abandoned *thirty-six years ago* (before the Apollinaris was discovered), and that the spring is now closed and the waters drawn from below the surface, and below its outflow, under some pressure and by a mechanical arrangement.

It appears to me that at the Schwalbach spring a case quite analogous with the Apollinaris spring is presented. In the former case the water when approaching its outflow loses its ingredient of chief value, its iron in solution, gaining instead a valueless something, while in the latter case (Apollinaris) the water loses its carbonic acid gas, its most valuable constituent, which is also disengaged as it approaches the outflow, and gains nothing in return.

If the doctrine is correct that mineral waters, to be *natural*, must be bottled—without the use of technical means—as found and taken at the *outflow* or *surface* of the spring, it follows that

at Schwalbach the waters should be bottled in such manner as to deprive them of all and every medicinal value; and, furthermore, that the Prussian Government in its course of procedure at Schwalbach and Niederselters (and also, as I am informed, at Geilnau, and perhaps at Fachingen) is inculcated with the Apollinaris people. The wrong done differs only in degree, the principle involved being the same in each case. It would seem that the Prussian Government and its advisers *think* that their course of procedure is right, for the processes are not only openly carried on, but are published to the world.

If in order to maintain its name and status as a *natural* mineral water the water must be bottled as found at the spring's surface or outflow, it would seem to follow that the water as it exists in the spring's depths, or in the bowels of the earth, is not a natural mineral water if it be endowed with constituents which are changed in form or are lost upon approaching the outflow. To illustrate, if the spring be 1,000 feet deep, the water taken from within say two feet of the actual surface would be natural mineral water, while, if drawn from any depth in the remaining 998 feet, it would not be a natural mineral water. If not, what is it? The more reasonable theory would appear to be, that the water is more nearly in its *natural* condition in the spring's depths, where its mineral constituents are not affected by the influences of the atmospheric air, and it is protected from the prejudicial effects—and this is important—of organic matter at the surface. Therefore if the spring be 1,000 feet deep it would be right and proper to bottle the water as found at the average depth, or 500 feet from the surface.

If the water contain in the spring's depths constituents, such as iron in solution, or carbonic acid, which give it its essential quality as a natural *mineral* water, and such constituents be disengaged and lost, or their form and condition essentially changed upon coming to the outflow, and in contact with the atmospheric air, does it not cease to be a natural *mineral* water? If not, it certainly has, by being deprived of its characteristic quality, become a less *natural* and surely less valuable *mineral* water than if its lost constituents be restored or secured, even though inadequately or imperfectly, by technical means.

If carbonic acid gas can be restored to the water after having been disengaged therefrom, it would seem to follow that such *means* as are necessary to accomplish that purpose should be

allowed, otherwise the privilege would be valueless, and its allowance really misleading. Being a volatile element, carbonic acid in its separate state cannot be dipped up, poured out, held, measured, and applied in ordinary vessels and by hand, but *must* be managed by technical means and contrivances. The means and contrivances in use at the Apollinaris spring are as described by Special Agent Starring, and appear to be such as are necessary to the purpose, and, having been adopted before any of the water was exported to the United States, it cannot be supposed that they were arranged with a view to the evasion of our tariff laws. If, therefore, the owners of the Apollinaris spring are allowed to take the water from the spring's depths, and to restore to it during the process of bottling the quantity of carbonic acid contained in it at such depths, or which has escaped from it, I can see no good reason why they should not be allowed to continue the use of the means now employed.

WATER.

As stated at the outset, my first object and aim on being admitted at the 'Apollinaris-Brunnen' was to obtain water directly from the spring; in other words, to *see* the water in the spring and take it direct therefrom, myself, in my own way. This, as I have explained, I was unable to do, the spring being covered and I unable to approach within eight feet of it, on account of the enormous exhalations of carbonic acid gas, which would have been increased of course had the cover been removed. I found two large pipes leading from the spring; the one was found to be connected with a reserve pump provided against accident, the other I traced to where the water was flowing from it into a basin or font, from which it is conducted into the tanks or reservoirs, where it is stored prior to being reunited with the carbonic acid and bottled. Above this basin or font I found an earthenware vessel containing liquid chloride of sodium (salt in solution), which was dripping slowly through a small faucet into the water in the font, where it commingled at once on account of the agitation produced by the inflowing water. I was informed by the manager of the spring that the solution was so prepared and the faucet so adjusted, with reference to the pipe's capacity and outflow, as to impart exactly one part of actual chloride of sodium to 1,000 parts of water.

The water as it flowed from the pipe was tested, and its tem-

perature found to be 17° Réaumur. I filled a number of glasses with it at different times as it flowed from the pipe, and found it uniformly bright and sparkling, utterly devoid of visible particles or film, and giving out perceptible quantities of carbonic acid. I tasted it repeatedly and was unable to distinguish any difference between it and the water as bottled and sold. I also examined, tasted, and compared it carefully with and against water dipped from the font, and the tanks, or reservoirs (containing the added chloride of sodium), and could detect no difference in their taste or general appearance. Being aware, however, of my infirmity of vision and of sense of taste, and of the unreliability of these organs in such a case, I filled six bottles with the water as it flowed from the pipe, which, corked, sealed, and labelled, I shall forward to the department along with six bottles obtained from this pipe by United States Consul Bullock, in 1878, as shown by his seal and label. I also had six bottles filled with water which passed direct from the spring through the copper cylinders (where the carbonic acid was added) to the bottling machine (but without having passed through the tanks or received the added quantity of chloride of sodium). These also, duly sealed and labelled, I shall forward to the department, together with six bottles of water obtained in the same way by Consul Bullock in 1878, as shown by his seal and label, the same having been retained and carefully preserved by the proprietor of the spring, together with a number of other bottles, one of which being opened I tasted and compared it with water bottled in the same manner for me, and there was no perceptible difference between them. A comparison of the bottles I have sent, upon their arrival at the department, will serve to confirm or disprove my experience and judgment as to these waters.

While inspecting the different pipes, pumps, reservoirs, &c., I kept in mind what had been said to me with reference to the bottling of water from the river Ahr. A large pipe leading from a main pipe under ground was found connected with one of the pumps. This, I was told, was used to draw water from the river Ahr. This pipe leads from the pump to a brick-walled basin in the hill-side, some 50 feet distant from and 40 feet above the bottling room, having been located at that distance and altitude in order to secure sufficient pressure to convey the water therefrom to the works. I examined the basin carefully, and also the pipe through which the water is conveyed to the works, and became

entirely satisfied that this water is intended and used *only* for cleansing the bottles and for other ordinary purposes, and that neither it nor any other water is bottled there except the water which is taken from the spring. I drew from the basin a bottle of this water (from the Ahr), which I corked and sealed, and will forward to the department for the purpose of showing the utter frivolity of the belief, suspicion, or suggestion that it is bottled for export by the Apollinaris Company, as it will be seen that it is a totally different water from the Apollinaris, and could not be converted into it. I am heartily ashamed that *I* was betrayed into a suspicion at once so frivolous and groundless.

OXIDE OF IRON.

The use and purpose of the tanks or reservoirs, the condition of the water therein, and especially the formation and elimination of oxide of iron occurring there having been the subject of much speculation and discussion, I deemed it important that I devote particular attention thereto, which I accordingly did. Some of the tanks were found to be full, others partly so, and some entirely empty. These latter were first examined and found to be quite clean and bright, having but faint traces of discoloration upon their sides and bottoms (which are lined with Portland cement). Thinking it possible that these had been 'prepared for the occasion,' I inspected in turn those that were full to the brim and those partly filled. The water in the former was so entirely clear and transparent as to lead me to think at first sight that they were empty, while in the latter it was equally clear, but its presence was more readily discernible by the contrast of its surface line with the white walls of the tanks. There was absolutely no sediment, film, or suspended matter observable in the water, either upon its surface or in its depths, and the walls and bottoms of the tanks were clean and of almost uniform colour. In order to be thorough, and make 'assurance doubly sure,' the manager of the spring emptied one of the full tanks of its water, whereupon I critically examined its walls from top to bottom, rubbing them with the hand without finding other than the very slightest occasional deposits, and no appearance of suspended matter whatever. About an inch of water remaining at the bottom of a tank, small particles of earth, purposely dropped therein, appeared in bold relief, the depth being some eight feet.

Having seen that the water, as it came direct from the spring,

and before passing into the tanks, was perfectly clear and free of all suspended matter, that there was no deposit of note to be found in these tanks, and that the water I dipped from them was, so far as I could see, exactly the same as when it came from the spring, I felt quite surprised and puzzled. For, having read, and felt inclined to believe, that the water was run into the tanks for the purpose of eliminating the iron, and finding no iron in these tanks and no difference of appearance in the water before and after its being stored, I could not understand where the iron went to which was eliminated, and for the elimination of which the storing was said to take place. The traces which could be discovered in the tanks were, as I said before, so very slight that I feel quite sure *they* are not worth being taken out. At this stage in my investigation I made numerous inquiries of the manager and proprietor of the spring relative to the iron, the use and need of the tanks, &c., and was given so much information, direct and indirect, inferentially and otherwise, that I prefer and deem it best to give it *in extenso*, and, as near as I can recall it, in the order and words as given me.

I was shown the analyses of the water, taken direct from the spring, made by Dr. Bischof, Dr. Mohr, and Professor Odling, and my attention called to the quantity of iron which they each found in such water. The figures given were, in 10,000 parts of water, viz.: Bischof, 0.068; Odling (less than one half of Bischof), say 0.034; Mohr, 0.038. My attention was also called to the work (inclosure A) by Professor Fresenius on Niederselters, which water, according to his latest analysis, contained iron 0.030, while the analyses therein by Kastner, in 1838, contained 0.102. Thus the latest analysis of the Apollinaris shows an infinitesimal quantity of iron in excess of that now contained in the Selters, and that practically the one spring contains the same amount of iron as the other, and neither of them of any consequence.

If, then, the storing is done for the purpose of eliminating the iron, it would seem absurd to adhere to it if the elimination did not take place, and if it did eliminate the iron, the analysis of the water, *after* it had been stored, would show that the small trace—for it is no more—found in the water direct from the spring had disappeared. Nevertheless, I was told that the analysis made by Dr. Battershall, as forwarded to the department, shows, in 10,000 parts water, 0.088, 0.140, and 0.141 of iron. These analyses, having been made with a view to guiding the department in its

decision, were of course made with the greatest care, and with the object of showing the amount of iron in the imported water; it is right, therefore, to assume that they are correct and to be depended upon. They give, however, an *increase* instead of a *decrease* of iron, and not a slight but a very considerable increase, in fact more than four times as much as Odling found, and nearly four times as much as Mohr found (in water direct from the spring), and hence it would seem that the alleged object in storing the water is not only not accomplished, but this operation actually produces the very reverse of what is intended thereby. Otherwise it follows that Bischof, Odling, and Mohr were wrong, and if so the iron, of which there ought to be then a perceptible quantity, ought to be found in the tanks, which, as I have said, I did not succeed in doing. Said the manager, 'If the storing of the water is done for the purpose of eliminating the iron, and this object is not accomplished, why should we continue the operation? And, on the other hand, if the iron is eliminated and does good, why is it only done, as we believe it is, at the Apollinaris spring?' The manager said they attached no value or importance whatever to the quantity of iron in the water, as it did not influence in any way its taste, nor did its elimination fulfil the object which was ascribed to it, because when, for experimental purposes, the water had been freed entirely of the iron, and this water mixed with spirits or wine, it became after a short time discoloured, which discoloration was believed to be due to the bicarbonate of soda in the water. If this is so, the theory of the elimination of the iron becomes still weaker.

In further explanation of the storing of the water, I was referred to Niederselters, where I found no exhalations of carbonic acid, and where the operation of bottling takes place a couple of feet below the level of the spring. I was told that if the exhalations of carbonic acid at the Apollinaris spring and its immediate neighbourhood allowed similar arrangements, they would have been adopted long ago, as they would not in the least prevent the water from being reimpregnated with the gas it had lost on its way from the depths. But it being an absolute impossibility to carry on such operation at this spring (and even the most superficial examination proves this), there is nothing left but to carry the water into the tanks in the manner in which it is done.

The question of the yield of the spring, I was told, has nothing at all to do with the matter. It is much more a question of

requirements which must be met, whether they are large or small, and which are by no means of an average character, but depend very much on the temperature and the shipping opportunities which offer. I will add here that I was told that there were days this summer when about 70,000 litres of water were bottled. I was assured by the proprietor and the manager that the yield of the spring does not cause them the least uneasiness. Professor Wanklyn, on behalf of the Apollinaris Company, made experiments some time since to gauge the yield of the spring, and arrived at the result that it would yield 40,000,000 bottles per annum; how he arrived at this figure they say they do not know. They informed me that last year, at a time when they were not bottling, they allowed the pump to work with its utmost power for 72 consecutive hours. They analysed the water at the beginning and at the end of the pumping, and obtained the same results, concluding, therefore, that by what they had done they had not strained the spring; but the only value really which the experiment had was to show that the spring yields a great deal more water than is used at present, and is therefore in this respect in the same position as the Niederselters spring, and nevertheless it was found necessary, as hereinbefore shown, at this latter spring, to discontinue sinking the iron tray with empty jugs into the spring, because it was feared that the agitation thereby produced would have a prejudicial effect upon the spring in its depths. Alluding to this, the Apollinaris manager argued:—

If the Prussian Government was afraid of the influence which such slight agitation, occurring at the top of the spring, might have on the spring in its depth, how much more cause has the Apollinaris spring to avoid the agitation which would follow if the cylinders were filled direct at short intervals to suit the requirements, and in a sufficiently short time not to interfere with the practical working of the spring, especially as at this spring the water is taken direct from the depth, where naturally the influence would be much greater than at Niederselters.

From this it appears that the proprietors of the Apollinaris spring consider that their interest in the spring, which of course is great, makes it necessary that they should avoid agitation of the spring, and hence should draw off the water in a manner as even and regular, and to cause as little commotion, as may be possible; and this, it appears, can only be accomplished by means of reservoirs. It is true, they said that they at times have much more water in the reservoirs than they need, and they then run it off, which operation is neither costly to them nor attended with

danger to the spring. When I add that they mentioned that the spring has a lateral outflow to the Ahr by means of which the excess and surface water is carried off, I have given their explanation quite fully, and have said all that I deem necessary to say on this branch of the subject, except that, from what I saw, their explanation appears correct, and, if it be not correct, I cannot see what possible object they have for the use of the reservoirs.

From all the analyses I have seen of the Apollinaris water as taken from the spring, it appears that iron is really the most minute of its determined constituents—a mere trace—and as nothing compared with those ingredients which give the water its really valuable and characteristic qualities as a natural mineral water; hence it would seem that neither its presence nor its absence can affect the water at all seriously for the uses to which its governing constituents recommend and adapt it. If it be held that the partial, or even entire, elimination of this insignificant mineral constituent robs this water of its character as a natural mineral water, it would seem to follow that all mineral waters to be natural must contain *all* their natural ingredients, to insure which all waters containing ingredients (such as carbonic acid, iron in solution, &c.) which are affected by atmospheric influences would, instead of being ‘dipped from the spring’ or taken at the outflow, have to be bottled in the spring’s depths, and entirely beyond the reach or influence of the atmospheric air, contact with which spontaneously and unavoidably eliminates, reduces, or changes the form of such ingredients.

Without discussing the propriety or soundness of such a ruling, I can only say that its adoption by the department would, I apprehend, be most tenaciously resisted, as it would exclude from the free list, in addition to the Apollinaris, the Selters, Schwalbach, Fachingen, Vichy, Kissengen, Roisdorf, Ems, Carlsbad, and in fact practically all the mineral waters now exported to the United States.

COMMON SALT.

As hereinbefore shown, the Apollinaris Company adds to the water, after it comes from the spring, a quantity as stated, 1 part to 1,000 of chloride of sodium or common salt, this system having been readopted, in lieu of steeping the corks in brine, which was pursued at the date of General Starring’s investigation. The manager of the company informed me that they felt justified in

returning to this practice from the terms of the department's decision of February 21, 1879, viz. 'The Apollinaris mineral water as heretofore imported,' such practice having been adopted soon after the spring was discovered (long before any of the water was exported to the United States), and had been continuously practised up to within a short time previous to General Starring's visit.

The avowed object of the proprietor of the spring in adding this salt has been fully reported and explained to the department, and I doubt not was duly considered when the decision in question was made. The proprietor insists that it is done as a precautionary measure, viz. to guard against the possibility of the water's deterioration or decomposition from contact of the sulphate of soda with the organic matter of the cork, and is *not* done for any other purpose whatever. They have explained to my satisfaction that the system is decidedly preferable to that of soaking the corks in brine, as, while it does not as a rule add any more salt to the water, it imparts it more definitely and equally, and at the same time avoids communicating to the water more or less dirt, which came from the men's hands in handling the corks when wet with brine, and which followed the brine into the water when the cork was driven into the bottle. They scouted the suggestion that this introduction of salt was done for the purpose of covering or destroying any disagreeable taste in the water, for it has none naturally, or to increase its pungency, for it makes no difference in its taste. Nor was it done, as has been alleged, to imitate the Selters water. It seems singular, indeed, if it is added for these purposes, or any of them, that they do not add more than they do. To the, say, 4 parts in 10,000 of water, they add 10 parts, making, all told, 14 parts, whereas the Selters water contains 24 parts in 10,000 of water. If the salt is a good thing, and is added for the purpose of improving the taste or to make it resemble the Selters, it does seem strange that they do not add 10 parts more while about it. If it be wrong in principle to add the salt, it makes no difference whether the quantity added be 1 part or 20 parts.

While this addition of salt does unquestionably change the water in *some* degree from the condition in which it exists in the spring, and therefore amounts to an increase of its natural ingredients, the practice appears to have the sanction and approval of the highest scientific authorities (as shown by papers in the department's possession), and, being traditional, is sanctioned by

usage, having, as I am informed, been pursued in some form or other at many other mineral springs for very many years, and before the Apollinaris was discovered. I am aware from personal knowledge that it is an old and common practice to put salt in and about wells, springs, and cisterns, to purify the water, and to preserve it from decomposition.

Consul Bullock and Special Agent Starring have both, in most clear and unambiguous terms, stated in their reports that after the most careful tests they were unable to detect any difference, either in taste or appearance, between the water obtained direct from the spring and that containing this addition of salt. Their statements have been concurred in by a number of gentlemen distinguished in Europe for their scientific attainments and high character. As hereinbefore shown, my humble testimony is added to theirs, and can be either disproved or verified by samples of water I shall forward to the department, the condition of which may perhaps also serve to show whether the addition of salt is necessary as a preventive measure.

If the presence of this added salt is not perceptible to the ordinary palate in drinking, and it requires the alert senses of an expert to detect its influence upon the water's taste, it would certainly seem that it is not added for the purpose of improving the taste, but rather, as is claimed, with a view to preserving the water's natural taste. If its use be really necessary in order to preserve the water's natural taste, to prevent the water from being essentially and prejudicially changed from its natural condition by reason of contact with a foreign substance—the cork, which must be used—would not the water become in fact *less natural* from its change of condition on account of contact with such *foreign substance* than from the addition of the salt? Certainly the visible effect upon the water would be vastly more pronounced in the former case than in the latter.

If the added salt does not visibly or materially affect the taste of the water, in what respect does it change its quality more than it would be changed if an entirely tasteless substance, such as paraffin, were used instead? I am told that paraffin would serve the same purpose as soaking the corks in brine, and that, being itself tasteless, it would not impart any taste to the water; nevertheless, its use would appear technically more objectionable than that of the salt, since it is a substance foreign to

the water, while salt (chloride of sodium) is an important natural constituent of the water.

I have shown that at the Schwalbach springs the Prussian Government, with a view to securing and preserving the waters there in their natural condition, openly and avowedly resort to the use of artificially prepared carbonic acid. The cases are parallel; if the one be wrong the other cannot be right. If the Apollinaris is dutiable, the Schwalbach cannot be admitted free. In this connection it is deemed proper to state that I am informed that, in a publication made in 1857, Professor Fresenius states that the Schwalbach system was introduced at Geilnau, which is also a Government spring.

My attention having been called to an advertisement of Mr. Carl H. Schultz, in the New York *Medical Record* (see inclosure I), embodying a 'caution' to the public, based upon an alleged decree of the Emperor Wilhelm of Germany, relative to certain artificially prepared mineral waters, and having been told that this had reference to the Apollinaris water, I called the attention of the Apollinaris Company thereto, and informed them that I would receive an explanation thereof from them. They replied by informing me that when Mr. Schultz's original advertisement appeared their American agents, Messrs. De Bary & Co., called upon the German consul at New York and made protest against it, and were assured by that official that his confirmation was only intended as an attestation of Mr. Schultz's signature; had no reference to the advertisement; that he had not intended to authorise the use of his name for the purpose Mr. Schultz had made of it, and that he would at once have the matter corrected. They stated that as a matter of fact the advertisement was then discontinued in the form as if emanating from or sanctioned by the Prussian Government; and although Mr. Schultz has since published the advertisement, as herewith inclosed, he has not dared to refer to the Apollinaris water by name as being denounced by the decree directly or inferentially. They informed me, further, that the same advertisement had appeared in Germany previous to its publication in the United States, whereupon they took early occasion to complain thereof to the Prussian Government at Berlin, and were told that such instructions would at once be given as would afford relief and put a stop to the libel upon the Apollinaris water; and such instructions were given, and the publications suppressed. In proof of which they handed me the enclosed trans-

lated copy of a communication (marked J) from the German Minister of Agriculture, Estates, and Forests. They also informed me that the decree had reference only, or was so intended, to artificially prepared and compounded *medicinal* preparations made in the similitude of natural mineral waters, and merely cautioned dealers in mineral waters against the sale of such preparations.

It is respectfully submitted to the department whether Mr. Schultz's allusion to the 'connivance of custom-house officials' should not receive attention from the department, since such accusations not only bring the service into disrepute at home, but injure us seriously abroad.

GENERAL OBSERVATIONS.

Having investigated, examined, and discussed separately and in detail those special features of the Apollinaris spring and water, and incidentally the other springs and waters inquired into, relative to which questions have been raised, I shall conclude this report with a few general observations deemed proper for the department's information and consideration.

The gentlemen who constitute and manage the Apollinaris Company are reputed to be exceptionally shrewd and sagacious. I am informed that they accidentally heard of the Apollinaris spring in the year 1873, and, after having gone to Germany and carefully examined it, contracted for a portion of its yield. Subsequently, in 1877, they contracted for the control of the spring's water for a period of *fifty years*, in which venture, I am informed, they invested large capital, stated at £100,000 sterling, and, in addition, are paying the proprietors—the Kreuzberg estate—annually between £25,000 and £30,000 sterling for the water. It is distant from the seaboard at Rotterdam, *viâ* the Rhine, to Remagen from 250 to 300 miles, and takes a vessel in tow from two to three days to ply between with supplies for and bottled water from the spring, which supplies and bottled water have to be conveyed by waggon—a distance of seven miles—between Remagen and the 'Apollinaris-Brunnen.'

The inquiry quite naturally suggests itself, why did the shrewd men of the Apollinaris Company, if they planned to make and put upon the market an artificial or spurious mineral water, go so far, make such large investment, subject themselves to such enormous risks and constant heavy expenses, when they could have secured a

spring of their own near the seaboard at trifling cost, which would have served as a base of operations?

As evidence of their belief in the superiority and great value of the Apollinaris spring and water, the Kreuzberg estate has at great cost purchased and acquired control of all the ground within a radius of about a mile round the spring, including the Landskron and the Heppingen (the latter by lease from the Prussian Government), in order to guard against its being tapped or injured.

The Apollinaris Company have furnished me a statement from their books, showing that their sales for the year 1880 were, in England, 2,750,000 bottles; in Germany, 1,100,000; in Holland, 800,000; in France, 300,000; and in Belgium, 100,000; from which it would appear that even in these countries, so favoured with mineral springs, and where the consumers of mineral waters are most discriminating and critical, this water is quite popular, and is considered a natural mineral water. The most eminent manufacturers of and dealers in mineral waters in the world (Schweppé & Co.), and others of importance in London, are large purchasers of this Apollinaris water, for which they pay regular prices, and sell to their customers in the original packages. It does not seem reasonable that they should do this if they considered it an artificial or manufactured water, but would make it themselves, which they could do much cheaper, as they do their soda water and other aerated beverages.

The Apollinaris water appears to be the same thing as when it was first introduced to the public and became an article of commerce. It is drawn from the same spring as then, undergoes the same processes, and is bottled in the same way. If it be an *artificial* water, where is the original and the *natural* Apollinaris spring, whose waters this is made to imitate? I have made most diligent inquiry, and have failed to obtain a trace of any other Apollinaris spring or to learn of any other natural mineral water of that name having been sold in Europe or exported to the United States. If, therefore, it is from the original and only spring of that name, and the water is the same as when first introduced to the public and became known to commerce as 'Apollinaris Natural Mineral Water,' it *cannot* be an *artificial* mineral water, for it is not *made* in imitation of any other natural mineral water of the same or of any other name; and, if it was ever commercially a natural mineral water, it is so now.

If, on account of the primary separation and subsequent reunion of the water and carbonic acid, the elimination of the iron, the addition of chloride of sodium, or the use of mechanical contrivances, it is held not to be a natural mineral water by the department, it appears to me it would have to be classified under section 2,516 of the tariff, as an article 'manufactured in whole or in part,' not otherwise enumerated or provided for, dutiable at 20 per cent., *ad valorem*, and thus be accorded the same treatment as ginger ale, soda waters, and such like non-alcoholic, aerated beverages. If it shall be so ranked, or if it be classed as an artificial mineral water, it would follow, as I have hereinbefore indicated, that the Schwalbach, Geilnau, Selters, and all other natural mineral waters whose natural condition has undergone any change in the bottling process, either by the elimination or reduction of their natural ingredients, the restoration thereof or addition thereto, should be likewise classified; and in that view, as well as for other reasons, I would respectfully recommend a careful examination of all mineral springs from which waters are exported or understood to be exported to the United States.

I deem it proper to say, in conclusion, that having, from representations made to me at different times and from a number of sources, inclined toward, and perhaps expressed, the opinion that the Apollinaris water was not a natural mineral water in the sense of the tariff, I have felt it the more incumbent upon me to describe and narrate circumstantially and in detail the manner of my investigation and circumstances attending the same. I have also felt it to be my duty to report in full and at length the information and facts obtained, as well as to present the reasons and arguments which have influenced my mind in the conclusions stated and indicated. All of which I respectfully submit, in the hope that my humble efforts in the premises may in some sense aid in the final, wise, and just decision and settlement of the questions involved, which have been the subject of such earnest inquiry and tenacious and acrimonious controversy, and have been attended with so much expense to the Government.

Very respectfully, your obedient Servant,

GEO. C. TICHENOR,

Special Agent.

HON. WILLIAM WINDOM,

Secretary of the Treasury, Washington, D.C.

[INCLOSURES.]

- (a) Publication of Professor Fresenius on Niederselters springs.
- (b) Leaf from book with analysis, &c., of Neuenahr springs.
- (c) Map of the Ahr Valley, in the district of Neuenahr.
- (d) Book by Dr. Weidgen, relative to the baths and springs at Neuenahr.
- (e) An old print from a work by Dr. Carl Waller.
- (f) Volume relative to springs at Schwalbach.
- (g) Letter of Mr. Edward Steinkopff, relative to Mr. Scannell, &c.
- (h) Statement of Dr. Carl Bischof, relative to Apollinaris and Neuenahr springs.
- (i) Leaf from New York Medical Record, containing advertisement of Mr. Carl H. Schultz.
- (j) Translated copy of an official paper from the German Minister of Agriculture, Estates, and Forests, relative to publications detrimental to Apollinaris water.



JANSON, COBB, PEARSON & C
22, COLLEGE HILL, E.C.