and senile dementia can not always be made, if the history fails.

The second element in the differential diagnosis of the results of "primary" apoplexy from paralytic dementia or other cerebral affections is the presence or absence of the symptoms characteristic of these affections but not usual in the simple apoplexies. The condition of the pupils, the tremor, or the peculiar mental condition common in paralytic dementia, the severe headaches, the optic neuritis or optic atrophy of brain tumors, together with other symptoms common to these affections considered either separately or as a symptom-complex, will enable one to determine the pathologic condition.

89 Marlborough Street.

THE PLAGUE IN SAN FRANCISCO.

DOUGLASS W. MONTGOMERY, M.D.

SAN FRANCISCO, CAL.

THE JOURNAL has asked for the facts about the plague in San Francisco. The following are the cases, with their bacteriologic examinations, and experiments on animals as given by Dr. W. H. Kellogg, city bacteriologist, and Dr. J. J. Kinyoun, U. S. quarantine officer. I can endorse these tests and examinations, as I have taken a steady interest in them, and was deputed to follow them. Furthermore, the character of the men making these tests is above suspicion, and the scientific examinations made may be taken as correct, no matter what the conclusions drawn from them should be. They are here set before their proper jury, the medical profession.

The following reports of cases are made up from notes furnished me by Drs. J. J. Kinyoun and W. H. Kellogg: (Case 1 was reported in full in THE JOURNAL for May 19, p. 1236, and a full report of the result of the animal experimentation was also given.)

Case 2.—Chu Gam, aged 22, died March 15 at 723 Sacramento street. No clinical history was obtainable. The friends of the deceased gave conflicting stories as to his illness, some claiming that he had been sick over two months. When the body was first seen the face was enormously swollen and edematous; the skin of the whole body greenish black, and large blebs were present on the dependent portions of the body. The body had the appearance of having been dead a week. On section there was found a very little enlargement of the lymphatic glands. The lungs were dark and congested, but showed no evidences of pneumonia. The heart was very soft, with thin walls; there were no valvular lesions. There was considerable turbid fluid in the pericardium, in the pleura and in the peritoneal cavities. The spleen was enlarged, dark and friable, and the intestines showed evidences of inflammation. Microscopical examination of the blood and spleen demonstrated putrefactive organisms in large numbers and a few bacilli which had the appearance of the bacillus of plague. Attempts made to isolate this organism from the rest were successful. Cultures so isolated were sent to Dr. Kinyoun with the request that he inoculate an animal from these. Dr. W. H. Kellogg was informed that the animal died within 36 hours, of what appeared to be acute toxemia, and on examination very few organisms were found in the tissues except those at the point of inoculation. These gave a typical picture of plague.

Case 3.—Ng Ach Ging, aged 35, died March 17, at 905 Dupont street. No accurate clinical history was obtainable. The man was found dead, and immediately thereafter was turned over to the undertaker for burial. At the autopsy, performed forty-eight hours after death, the body was fairly well-nourished, but considerably discolored. On section, the glands were found not to be enlarged. The peritoneum contained about three pints of bloody fluid. The intestines were reddened, and the blood-vessels of the mesentery engorged. The spleen was slightly enlarged, dark in color and friable. The liver was slightly enlarged and congested. One of the most remarkable features was the complete transposition of the viscera. The spleen occupied the right side, the liver the left, the cecum being in the left iliac fossa. The lungs were edematous and hypostatically congested. The pericardium contained about two ounces of flocculent serum. There was also a considerable quantity of bloody serum in each pleura. The heart cavity contained several clots. Specimens were taken from the spleen and heart's blood for microscopical examination, which showed quite a number of putrefactive organisms present, and in addition thereto a short thick bacillus with rounded ends, which had the appearance of the bacillus of bubonic plague. It was readily decolorized by Gram's method. Animal inoculations were made from this material, which killed a guinea-pig within thirty hours and a white rat in five days. Drs. Kellogg, Kinyoun and Ryfkogel were present at the autopsy.

Case 4.—Lee Sun Kong, aged 47, died March 18, at Oneida place. When seen, forty-eight hours after death, the face was swollen and edematous. The skin of the whole body and part of the face and neck was greenish black. There was but little enlargement of the lymphatic glands. The lungs were dark and congested, but there were no evidences of pneumonia. The heart was soft and flabby, the walls of the ventricles thin, but there were no valvular lesions present. There was an inflammation of the peritoneum, the cavity of which contained one or two pints of turbid bloody fluid. The spleen was enlarged and very dark and soft. Microscopic examination of the blood and spleen demonstrated myriads of putrefactive organisms, and also a short thick bacillus with rounded ends, corresponding morphologically and in staining reaction to that of the bacillus of plague, and also corresponding in every respect to the organism found in the previous cases. This organism was not isolated in pure culture.

Case 5.—Law An, male, aged 38, a resident of California for thirty years, died April 24, in St. Louis alley, off Jackson street. This man had a large bubo in the left femoral region. Incision disclosed considerable bloody fluid and hemorrhages in surrounding tissues. Coverslip preparations showed among other organisms the bacillus of plague. Two guinea-pigs were inoculated, with the result that one died in fifty-eight and the other in sixty-one hours. Both these animals showed typical lesions of the plague, and the bacillus was found in large numbers in the spleen and heart's blood.

Case 6.—Lim Fa Muey, female, aged 16, died at Clay Street, May 11, seventeen days after the fifth case. She had a large bubo on the right side, in the femoral region, over which a sticky black plaster had been applied by a Chinese physician. The glands were as large as walnuts, dark, and the interior soft and mushy. Smears showed the specific bacillus, and its identity was confirmed by inoculation experiments on animals by Dr. Kellogg. Dr. J. J. Kinyoun also made inoculation experiments and got positive results.

Case 7.—Chu Sam, merchant, fifteen years in California, died May 11, at 717 Jackson street, aged 38. Dr. Kellogg saw this case on the day of death, with Dr. Wilson, at which time there was nothing visible to account for death, and the only suspicious thing about it was the heat of the body, which was quite noticeable, although twelve hours had elapsed since death. There was some distension of the abdomen with gas. There was a slight enlargement of the lymphatic glands in the femoral region, more marked on the left side, and these Dr. Kellogg removed for examination; but their appearance was so innocent that he set them aside and did not inoculate with them until forty-eight hours after removal.

The next day we went down to perform an autopsy and found the body in such a state of decomposition that we could not have recognized it as the same one we saw eighteen hours before, had it not been for a secret mark which we used to prevent substitution of bodies. The face was puffed up and edematous, the abdomen almost ready to burst with contained gases, and the skin discolored all over. The heart was very flabby, walls thin, and ventricles distended with gas; the lungs were normal, and the peritoneum was slightly inflamed. There was some fluid in both pericardial and peritoneal cavities. The speen was much enlarged, being six inches long, four inches wide and two thick. Color, a dark greenish slate with reddish patches. Smear preparations from the blood and spleen showed many organisms, but nothing resembling the bacillus of plague. Animals inoculated from the spleen died of toxemia, but no pest organisms could be demonstrated in them. The lymphatic glands, removed the day before autopsy, were slightly enlarged and showed slight hemorrhages into the gland substance; but they were firm and otherwise normal. A smear preparation showed a few organisms resembling the bacillus of plague, as seen in cultures. A guinea-pig which was inoculated with an emulsion of the glanduar substance died on the sixth day, with most typical lesions of plague. The spleen was at least ten times its normal size, covered with yellowish spots which, when examined, showed the presence of the plague bacillus in enormous numbers and in pure culture. The whole of the abdominal wall was edematous and there was an extensive coagulation-necrosis about the site of isolation. The organism was isolated from the spleen in a pure culture. The appearance of the body and also the pericardial lesions and general condition of the viscera were in every way identical with Cases 2, 3, and 4, already reported, in which difficulty was encountered in isolating the organism. It is believed, in view of the fact of this case, that if the glands had been taken from Cases 2, 3, and 4 as soon after death as in this case, and animal inoculations made from them, the same results would have been obtained. In this case, before the results of animal inoculation were known, the obscurity of the lesions seemed to be more in keeping with beri-beri than with bubonic plague.

Case 8.—On May 15 Dr. J. J. Kinyoun was informed by the assistant city physician, Dr. F. P. Wilson, that he had been notified of the death of a Chinese girl, which had occurred at the Pacific Hospital on the previous evening. The history obtained from the attending physician was that the girl, Chin Moon, was 16 years of age, a servant in a respectable Chinese family, at 730½ Commercial street, and had been ill for about five days. The girl was seen about three days before she died, and the symptoms then presented were headache, high fever, nausea, and pain in the right iliac region. The attending physician made a diagnosis of typhoid fever, and, observing the case to be very critical, had her sent to the Pacific Hospital; she was then in a moribund condition, and died on the following day. The attending physician at the hospital also made a diagnosis of typhoid fever and stated to me over the telephone that probably here was appendicitis. Dr. Kinyoun was invited to be present and assisted Drs. Kellogg and Wilson in making the post-mortem examination. An inspection of the body showed it to be well-nourished, and presenting no evidence of long illness. In the right femoral region there was rather an obscure swelling, which on palpation revealed a considerable mass of glands about the size of a walnut. Dr. Kellogg made an incision through the tissues down to this mass and demonstrated the correctness of the diagnosis. The swelling was a mass of enlarged glands. The tissues surrounding this mass of glands were edematous, containing a quantity of bloody serum. The mass of glands was dark, and hemorrhagic on section, and it was soft and necrosed in the center. Immediately on its removal Dr. Kellogg cut the mass in two, which on examination revealed the same organisms as had been previously observed in the glandular tissues of previous cases.

On the morning of May 14 Dr. Kellogg inoculated two guinea-pigs, weighing about 500 grams each, with an emulsion made from this glandular tissue. Death occurred in these pigs in sixty hours. Examination of guinea-pig No. 1 showed edema covering the whole of the abdominal wall. The peritoneal cavity contained a large quantity of bloody serum. The spleen was enormously enlarged, dark in color, and friable. Yellowish spots were observed on its free surface. The liver was enlarged and darkened, and the intestines were darkened and congested. The mesentery contained a considerable number of small hemorrhages in and about the mesenteric glands. The pleural cavity and the pericardium contained a considerable quantity of bloody serum. Coverslip preparations made from the point of inoculation, from the spleen, from the liver and from the heart's blood, showed an enormous number of short bacilli, having rounded ends, taking a typical bipolar stain. Cultivations were made from the several organs. In guinea-pig No. 2 the appearances were identical, with the exception that the spleen did not contain yellowish spots, as previously described in the case of guinea-pig No. 1. Coverslip preparations made directly from a portion of the mass of glands removed from the Chinese girl showed enormous numbers of a short bacillus with rounded ends, taking the characteristic stain. Cultivations were also made from this piece of gland, with the result that after thirty-six hours numerous colonies were observed on the surface of the agar and blood-serum. The cultures made from the several organs of the two guinea-pigs showed after thirty hours numerous small colonies on the surface of the blood-serum and agar tubes. These colonies were transparent, and when viewed under a low power were seen to be very slightly granular, and had a slightly irregular contour. Coverslip preparations made from these colonies gave identically the same picture as observed in the original preparations from the gland. The organism was non-motile. These pure cultures killed the animals injected with them, within sixty hours, and the post-mortem appearances were identical in every respect with those observed in the animals inoculated with a portion of the gland. Dr. Kinyoun, who was present at the post-

mortem examination of this Chinese girl, took tissues directly from the body, and made independent examinations clear through and the above description is an amalgamation of the notes made both by Dr. Kellogg and Dr. Kinyoun.

Case 9.—Herr Woon Jock, aged 53, male, laborer, married, ten years in California, had recently arrived from Stockton. He died May 14, at 740 Pacific street. Examination showed a bubo on the left side in the femoral region. The skin over the swelling was slightly discolored. The gland was dark and mottled on section, contained considerable serum, and the glandular tissue was soft and mushy. The smear preparation showed great numbers of the bacillus of plague, the identity of which was confirmed by animal inoculations.

Case 10.—Dang Hong, aged 40, male, laborer, a resident of California for the last sixteen years, died May 29, at 706 Pacific street. There was a large fluctuating swelling under the left side of the jaw, and a slight enlargement of the glands in the femoral region. Dr. Kellogg cut down on the glands on the left side and found them necrosed, and some thick pus present. A smear preparation showed the plague bacillus in the glandular tissue from both sources. The next day at 11 a. m. an autopsy was performed, at which were present Drs. Shrady, Montgomery, Kinyoun, Wilson, Morrissey, Cable and Kellogg. The lungs were normal, the heart muscle pale and flabby. About six ounces of bloody serum was found in the pericardial sac. The pleuræ contained about a pint each of the same fluid, and the peritoneal cavity three or four pints of bloody-serum. There were no lesions of Peyer's patches, but congestion of the peritoneal coat of the small intestine in spots. The great omentum showed intense congestion; the spleen was perceptibly enlarged and its substance a reddish brown color; and the mesenteric glands were enlarged. Animals were inoculated with the emulsions made from lymphatic glands, by Dr. Kinyoun and Dr. Kellogg, independently, and all died with typical plague infection.

Case 11.—Chen Kuey Kim, cigarmaker, single, aged 49, died June 2, at 10 a.m., at 817½ Clay street, between Dupont and Stockton streets. He had lived twenty-five years in California. An unreliable history of nineteen months' illness, with cough, was obtained from the undertaker and the Six Companies' physician. It was also stated that he had been sick for four or five days before death. The body was that of a large, well-built and well-nourished man. There was an incision in the left groin and on the right side of the neck from which the lymphatic gland had been removed. The integument was beginning to turn dark all over the body, but was more marked on the face and neck. The median incision passed through about an inch of fat. The lungs were dark and congested, but otherwise normal. The pericardium contained about 60 c.c. of bloody serum. The heart was a trifle flabby, but showed no valvular lesions; peritoneum dry; spleen enlarged and showing petechial hemorrhages beneath the capsule. A cross-section showed numerous yellow dots all through its substance, which was soft and friable. The mesenteric glands were enlarged and showed evidence of inflammation. Kidneys normal. By enlarging the incision found in the left groin a lymphatic gland about the size of a hazel nut was found, which as necrosed. Microscopical examination of this gland and of the heart's blood and spleen showed the presence in enormous numbers of the plague bacillus.

The autopsy on this case was performed by Dr. Donnelly, assistant bacteriologist, and was witnessed by Drs. F. P. Wilson, assistant city physician, Dr. Henderson, member of the State Board, and Dr. Kellogg. Drs. Henderson and Wilson accompanied Dr. Kellogg to the laboratory, where they were joined by Drs. Kinyoun and Baum, and where the preliminary examination of the blood, spleen and lymphatic glands was made and witnessed by the above named gentlemen. A coverslip preparation of the blood stained with thionin showed a marked leucocytosis and the presence of large numbers of the bacillus pestis, which were short rods with rounded ends, bipolar staining and frequently occurring in pairs. The Gram method of staining was also tried and they were found to decolorize perfectly. The spleen and lymphatic glands were simply crowded with large masses of the same bacilli, which was enough in itself to establish the diagnosis. To make assurance doubly sure, a guinea-pig was inoculated with an emulsion made from a piece of the spleen, with the result that it promptly died on the sixth day with the most typical and positive appearance of plague. The organism was recovered from the organs of the guinea-pig in pure culture and has been fully identified. Another pig was inoculated with this culture with the same result. Dr. Henderson, of the State Board of Health, witnessed preliminary examination of this case and took away with him slides which were made and sealed in his presence.

Case 12.—Jay Man Tong, male, aged 60, merchant, residing at 759 Clay street, a high official in the Six Companies. According to a certificate signed by white physicians employed by the Chinese, he had been sick for a year, and had died June 9, at 3 a. m. of angina pectoris; was said by his friends to have suffered from pain in the chest and cough for a year previously, and that his death was sudden.

Autopsy was performed June 9, at 1 p. m. The man was five feet ten inches in height, and weighed about 175 pounds. Body was well-nourished. Impaired tricuspid valve. Blood, in heart cavities, fluid. Two or three ounces of clear serum in the pericardium. Lungs normal. Some bloody fluid in the peritoneal cavity. Intestines were dark—distended with gas—and showed evidences of intense inflammation. Injection of vessels of mesocolon. Appendix normal. Spleen slightly enlarged.

Dr. J. J. Kinyoun reported on the animal experiments in the case of Jay Man Tong as follows:

June 10, 1900.—Guinea-pig 1, inoculated with emulsion of mesenteric glands stated by Dr. Kellogg to have been taken from the body of the Chinese, Jay Man Tong, who died the day before. Guinea-pig dead in 46 hours. Autopsy showed considerable edema at the point of inoculation, a slight enlargement and marked congestion of the inguinal glands, particularly on the right side. The spleen was not enlarged. The lungs were in a state of commencing pneumonia. The peritoneum was dry.

Coverslip preparations made from the point of inoculation, the spleen, heart's blood and lungs showed a large number of bacilli, short and thick, having rounded ends, with a tendency to bipolar staining. Cultures made from the spleen and heart's blood. After about sixty hours, the several cultures were examined and found to contain a mixture of several organisms, many of which were the same morphologically as those found in the tissues of the animal. It became necessary to again make secondary cultures to isolate the several species.

June 11.—White rat, half grown, was inoculated with

emulsion of the gland from Chinese dead June 10. Rat died after eighty-four hours.

Autopsy showed marked edema, and extensive suppurative necrosis of the abdominal wall, at the point of inoculation, some peritoneal effusion, spleen enlarged and dark in color. The kidneys were the seat of small abscesses. Coverslip preparations made from the point of inoculation, spleen, kidneys and heart's blood, showed enormous numbers of a short thick bacillus having rounded ends, bipolar staining, which were decolorized by Gram's method. Cultures made from the heart's blood, spleen and kidneys were examined after forty-eight hours, when large numbers of colonies of several varieties of bacteria were found. The colonies were so numerous and overgrown that it was impossible to isolate them, so secondary cultivations were necessary.

After several days colonies were isolated which corresponded in every way with those of the plague bacillus. June 24, 1 a. m., a half-grown white rat was inoculated with this culture. Animal dead June 27, 80 hours. Autopsy made June 28 in the presence of Drs. Ryfkogel and Fagan. There was a considerable area of suppurative necrosis at the point of inoculation, and an extensive edema covering the whole abdominal wall. The intestines were dry; spleen enlarged, dark in color and friable. Coverslip preparations made from the spleen, point of inoculation and the heart's blood, showed a short, thick bacillus, having rounded ends, which took a characteristic bipolar stain with thionin. It was decolorized by Gram's method.

Cultivations were made from the spleen and heart's blood and showed at the end of forty-eight hours characteristic colonies of the plague bacillus.

Besides the above cases, there were a number where the indications pointed strongly to the plague, but where either from advanced decomposition or superinfection, the plague bacillus could not be isolated.

The only bacteria which, in their size, shape and coloring peculiarities, might be mistaken for those found in the above cases, are those of hog cholera and those of septicemia of rabbits. Neither the hog-cholera nor the rabbit-septicemia bacilli, however, would be pathogenic for rats; they are therefore excluded as sources of error. The points of resemblance are very few, but Dr. Ryfkogel, to settle the question, inoculated a pigeon with plague bacilli from those cases, with no result. If they had been chicken-cholera or rabbit-septicemia bacilli, they would have killed the pigeon. The plague bacillus is innocuous to pigeons.

On the other hand, every fact speaks for a diagnosis of plague, and nothing valid has, up to the present, been brought against this view.

The following are the arguments against the existence of plague in Chinatown:

1. No two cases have been reported as occurring in the same house; 2. No diagnosis of plague had been made on a living patient; 3. The number of cases found has been too small for so virulent a disease as the plague, and the death-rate in Chinatown has not been notably increased.

In answer to the first objection, it must be remembered that the habitation of a given Chinaman in our Chinatown is a difficult matter to fix, especially at such a time as the present, when they are alert and suspicious. I believe it could only be accomplished by police registration similar to that practiced in European countries.

It is true that no diagnosis of plague has been made on a living patient, and I have it from a China woman, who is an educated physician, that no living patient having the plague will be found until the number of sick is so great that they can not be hidden. At one time lately the corps of white inspectors, all educated physicians, went over Chinatown three times in five days, from Monday till Friday inclusive, without finding any one sick. During three of these days, Monday, Tuesday and Wednesday, no deaths were reported in Chinatown; then immediately thereafter, two and three deaths a day were reported for several days. It is absurd to suppose that in a population of between twenty-five and thirty-five thousand, even when deaths were occurring, no one was sick.

In answer to the third argument against the plague being in Chinatown, it must be remembered that plague does not enter a community rapidly, but slowly and insidiously, and it is not till many disease foci are established that the disease assumes the proportion of an epidemic. It is thought by some well-informed men that the plague strikes a community with the same rapid malignancy that it attacks an individual. This is not so. It advances slowly in a community, attacking house after house. The people living in an infected house fall ill of the disease, but not even all the people in such a habitation contract the plague, or at least not all at the same time. Doctors and inspectors, as is well known, for instance in Bombay, visit such houses with impunity, but do not linger in them.

The outlook for the future is not bright. The plague has a tendency to subside during the summer, but probably it will appear with increased violence next winter. The board of health has done and is doing all the sanitation possible with the meager funds at its disposal, and there is some agitation on foot to put Chinatown in a thoroughly sanitary condition. The heart of the people is, however, not in the work, and they refuse to believe the plague is present. The daily press keeps up a steady abuse of the board of health, and of Dr. Kinyoun, on one hand, and urges several fantastic, impracticable schemes for cleaning Chinatown, on the other. Glimmerings of the truth, however, occasionally filter through. They protest too much that the plague is not present, and on June 29 last, one of the bitterest enemies of the board of health, the *San Francisco Chronicle,* in an editorial, even spoke of Chinatown as "the infected property." Infected with what?

It is a wise custom of the medical profession not to answer abuse appearing in the daily press by return abuse, and the board of health, Dr. Kinyoun and Dr. W. H. Kellogg have acted up to the best traditions of the profession in this respect. They have done and are doing their work well, without paying any attention to the papers.

SPECIAL ARTICLE.

RELATION OF PHARMACY TO THE MEDICAL PROFESSION.*

VIII.

ELIXIRS.

In the administration of liquid medicines, eligibility of the preparation is of importance scarcely secondary to that of therapeutic efficacy. With the advent of the elixirs, the former impalatable mixtures and decoctions were made not only more palatable but often even inviting to the other physical senses—odor and color. For about twenty years—1870-1890—the elixirs enjoyed great medical favor, they with the fluid extracts being the chief product of nearly a score of manufacturing pharmacists of national reputation. But like many other good things, the "elixir idea" became a craze; everything desired was presented in this form until drugs of the most

* The first of this series of articles appeared in THE JOURNAL of April 21.