obtained through the cooperation of the Division of Penicillin Control and Immunology. No activity appeared in the fractions until the major portion of chloroform was removed from the column. Fortuitously, the first band of activity to appear is that of penicillin K, in accord with its property of being the least hydrophilic of the four known penicillins. The total penicillin K was removed in three to four 25-ml. fractions, 70 to 75 per cent of the total appearing in one 25-ml. fraction. Subsequently, three to four 25-ml. fractions exhibiting no activity were collected prior to the appearance of the next active band. This provides for considerable latitude of operation. Elutions with ether were continued until all of the penicillin on the column was quantitatively recovered. The rate of elution was varied between 10 and 35 minutes per 25 ml. (with and without applied pressure) without causing any discernible differences.

From this laboratory's experience any losses entailed in the chloroform extraction are of equal degree for each of the penicillins. Consequently, the recovery of penicillin in the first band eluted from the column divided by the total amount of penicillin in the chloroform extract furnishes the per cent of penicillin K. To date this work has been confined to separating penicillin K quantitatively from the other penicillins.

A commercial sample of penicillins was subjected to the above procedure and a band of activity separated which was identified by differential assay as penicillin K.

References

1. COMMITTEE ON MEDICAL RESEARCH and U. S. PUBLIC HEALTH SERVICE. *J. Amer. med. Ass.*, 1946, **131**, 265–271.
2. COMMITTEE ON MEDICAL RESEARCH, U. S. PUBLIC HEALTH SERVICE, and FOOD AND DRUG ADMINISTRATION. *J. Amer. med. Ass.*, 1946, **131**, 271–275.
3. COMMITTEE ON MEDICAL RESEARCH, OSRD, WASHINGTON, and MEDICAL RESEARCH COUNCIL, LONDON. *Science*, 1945, **102**, 627.
4. GORDON, A. H., MARTIN, A. J. P., and SYNGE, R. L. M. *Biochem. J.*, 1943, **37**, 79–86.
5. MUNDELL, M., FISCHBACH, H., and EBLE, T. E. The chemical assay of penicillin. (Submitted for publication.)

Letters to the Editor

Sulfa Drugs and the Treatment of Furunculosis in Trout

Furunculosis, probably the most feared disease of salmonoid fishes, is due to a general infection by a specific bacterium, *Bacterium salmonicida* Lehmann and Neumann. In this country it affects chiefly trout in hatcheries, but in Europe it is also very destructive of wild trout and salmon.

There has been no curative treatment or means of preventing its spread through any pond, pool, or trough of fish among which it has appeared.

In August 1945, when the disease appeared among fingerling brook trout (*Salvelinus fontinalis*) at Leetown, West Virginia, the writer was assigned the problem of finding a cure by means of sulfa or other drugs.

For this attempt, all the fish in the pool in which furunculosis (bacteriologically confirmed by D. F. W. Hachtel) was present were distributed among 15 lower troughs in one corner of the hatchery.

From another pool, brook trout of similar age and size, but believed to be free from furunculosis, were placed in a group of 5 troughs at the opposite end of the hatchery. The weight of fish per trough was 15–16 pounds, and the estimated number of fish per trough, 450–480. In each block or group of 5 adjacent troughs, 4 treatments and a control (with no medication) were assigned to troughs by random selection.

The original treatments, begun on 30 August 1945, consisted in administering sulfamerazine, sulfathiazole, and furacin (or 2–20–99, a new drug) by mixing them with the food, and in adding furacin to the water of the troughs. On and after 14 September sulfanilamide (in food) and sulfadiazine (in food) were substituted for the furacin treatments, which seemed less promising than sulfonamide treatments.

The assigned or approximate drug rate or dosage was the same for all lots, except that the rate for furacin was half that for the sulfonamides. That rate varied from 5 to 11.5 grams/day/100 pounds of fish.

Among the fish believed to be free from furunculosis, losses were negligible until gill disease appeared among them, and other of the experimental fish, on 23 September.

Among the fish from the lots from the infected pool, mortalities through 21 September were approximately as follows: no medication, 50 per cent; sulfamerazine, 17 per cent; sulfathiazole, 23 per cent; furacin in food followed by sulfanilamide, 28 per cent; and furacin in water followed by sulfadiazine, 40 per cent.

Among the three infected lots being treated with sulfamerazine, mortality sharply declined within a week; and after 11 September (the 13th day of treatment) there were only three deaths until the gill disease appeared, after 23 September. Sulfathiazole seemed definitely helpful, but the mortality dropped less rapidly and had not completely stopped on 23 September. According to analysis of variance, the superiority of results with sulfamerazine was highly significant.

The results in this first experiment were so encouraging that further tests of sulfa drugs, especially sulfamerazine, for the treatment of furunculosis are to be made shortly.

JAMES S. GUTSELL

Fish and Wildlife Service, Leetown, West Virginia

Sir Oliver Lodge, Lord Kelvin, and Hertzian Waves

Apropos the recently announced Soviet claim that Russian scientists had anticipated Marconi, a story worth recalling was told by John Allen Harker, the British physicist, at a meeting held in Browning Hall, Walworth, London, on 26 November 1914:

"I remember the British Association meeting in Liverpool—in 1896, I think it was. At the end of the meeting on the last morning Sir William Preece, who was then chief electrician to the Post Office, had been describing, in the course of a debate on transmission of wireless signals, the fact that a young Italian had come a few months previously to his laboratory at the Post Office, and had succeeded in showing what was then an extremely novel thing: that wireless signals could be transmitted over a distance of about a mile. That young man was Mr. Marconi, whose name is now so familiar to us all. After the morning's work was done I was clearing away my apparatus in the preparation room attached to the Physical Lecture Theatre, where the meeting was held, and was having a word with Sir Oliver Lodge. As we were talking, Lord Kelvin came in—came up to Sir Oliver just like a schoolboy let out of school. For the program was over and he felt, like the rest of us that we had done our work. He said: 'Let's see, Lodge, weren't you on with something of that sort—with Hertzian waves?' 'Yes,' said Sir Oliver, 'and under the circumstances I'm sorry I didn't show this experiment myself. I have been so busy as General Secretary of the Association that I haven't had time to do what I planned to do during this meeting. I have been telegraphing by wireless signals between my house and this laboratory, and I intended to have had the installation fixed up to demonstrate to the members of this section.' Kelvin asked with enthusiasm: 'How far is it to your house? How far have you succeeded in getting good signals?' 'Oh, about two miles,' said Sir Oliver. I shall never forget the reply of Lord Kelvin. He said: 'That's right, Lodge. If Mr. *Macaroni* can go a mile, surely *you* can go two miles!' "

FRANCIS C. COULTER

R.D. 2, Milford, Connecticut

Inactivation of Hypertensin

In an article by O. M. Helmer and K. G. Kohlstaedt (*Science*, 1945, **102**, 422) the action of horse-radish peroxidase on angiotonin, pepsitensin, and epinephrine was discussed. The authors also mention that, whereas small concentrations of iodine have only a limited inactivating effect on these substances, the peroxidase reaction is greatly enhanced by the addition of small amounts of potassium iodide.

We have previously shown (New York Academy of Sciences Conference on Experimental Hypertension, 9–10 February 1945) that the inactivation of hypertensin by iodine is related to the tyrosine present in the molecule—as established by the use of the Gerngross, Voss, and Herfeld reaction. The parallelism between decrease of hypertensin activity and intensity of iodation is illustrated in Table 1.

TABLE 1

INACTIVATION OF HYPERTENSIN BY IODINE

Hypertensin (cc.)	Iodine added (micrograms)	Pressure effect in the cat (mm./Hg)
0.1	52	22
0.1	104	12
0.1	156	7
0.1	208	4
0.1	—	24

We have also shown that the tyrosine titrated by the Gerngross reaction is transformed into di-iodotyrosine or iodine tyrosine, substances with little or no activity. It is shown in Table 2 that the hypertensive activity of hypertensin (angiotonin) is suppressed when tyrosine is blocked with iodine.

TABLE 2

	Control	1 drop	2 drops	3 drops	4 drops
Iodine added	0	52	104	156	208
Titrated tyrosine ..	180γ	142γ	115γ	85γ	40γ
Pressor activity in cat (in mm.) ...	25	21	15	9	3

Since we have established that an inactivation of the same order occurs with postpituitary hormone (pituitrin), we believe that tyrosine also plays a role in the hypertensive activity of these substances.

It appears that tyrosine combines with iodine only when it is present as free iodine or as iodine with a positive charge; this is obtained when peroxide and potassium iodide or solutions of metallic iodine or iodine chloride are used. The results of Helmer and Kohlstaedt show that potassium iodide used in conjunction with an oxidizing reaction destroys hypertensive activity and thus confirm our previous statements.

EDUARDO CRUZ COKE

Laboratory of Physiological and Pathological Chemistry Santiago, Chile

Request for Reprints on Virus Diseases

Since the end of the war, letters and articles have appeared in numerous scientific periodicals requesting that reprints be sent to scientific workers in countries that have been out of contact with progress in America since 1940. One needs no more than a brief visit to become deeply impressed with the high regard these men have for the contributions and advances originating in American laboratories. There is a great need and an intense desire for reprints of published work in all fields.

I would like to extend to investigators in the field of virus diseases the request of two European colleagues—