Hyperfine Structure of Mercury Lines.

THE hyperfine structure of mercury lines has been studied by various observers but the results do not uniformly agree. Starting from the structure of λ 4916 $(6^1P_1 - 8^1S_0)$ given by Venkatesachar and Sibaiya,[1] the author and T. G. Srinivasa Iyengar[2] set up a term scheme to explain the structure of
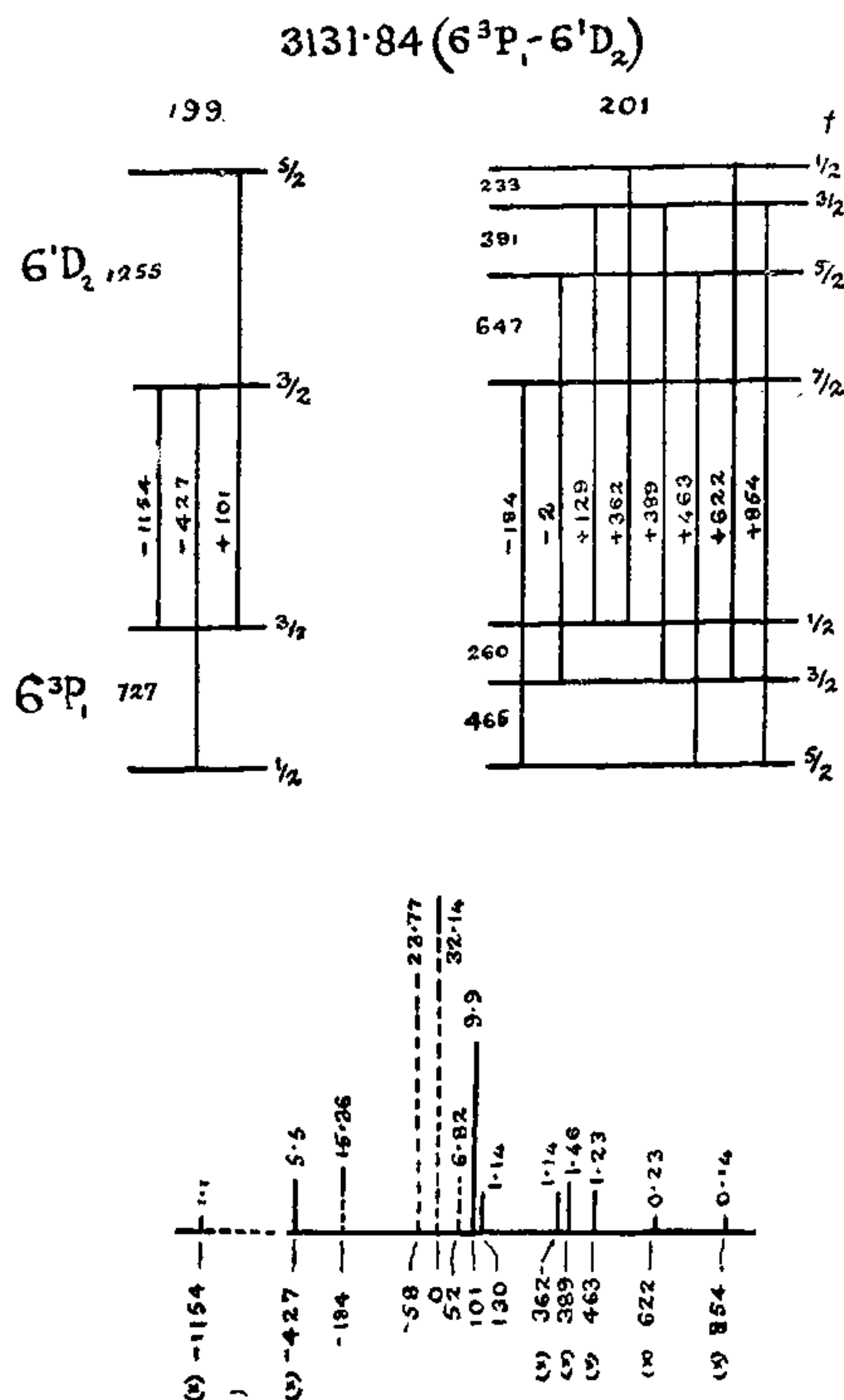

Fig. 1.

4916, 5791 $(6^1P_1 - 6^1D_2)$ and 5770 $(6^1P_1 - 6^3D_2)$. The structure of 3654 $(6^3P_2 - 6^3D_2)$ and 3125 $(6^3P_1 - 6^3D_2)$ was thence deduced and found to be in agreement with that recorded by Nagaoka.[3] Schüler and Jones[4] and Murakawa[5] have given another term scheme for these lines, based upon the structure of

4916 found by Schüler and Keyston[6] and Murakawa[7] respectively. The measurements of Nagaoka are in better accord with the scheme given in the paper above referred to.[2] Schüler and Jones[8] have recently found it necessary to alter the level scheme of 5791 in order to bring it into accord with the structure given by Görlich and Lau,[9] which, however, still contains some compo-
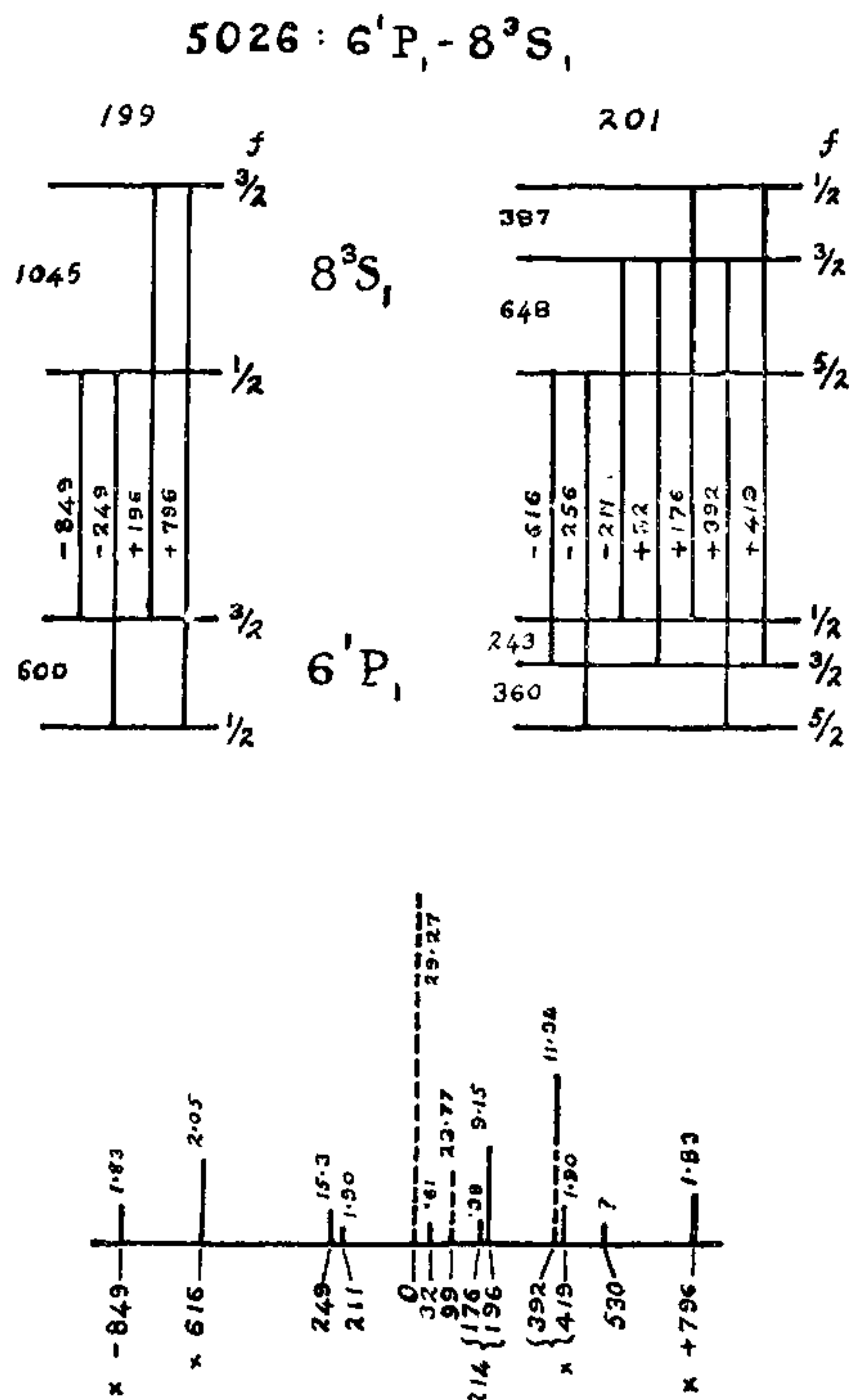

Fig. 2.

nents not coming under Schüler's scheme. The scheme set up by Murakawa is substantially the same as that of Schüler and Jones[4] except that the level-separations are slightly different corresponding to differences in the wave-number separations of the satellites. Now this scheme gives for 3131.84 $(6^3P_1 - 6^1D_2)$ a structure very different from that of Nagaoka, which can, however, be explained

[1] *Journ. Mys. Uni.*, **4**, 148, 1930.

[2] *Proc. Roy. Soc*, **A. 137**, 216, 1932.

[3] Quoted by Ruark, *Phil. Mag.*, **1**, 977, 1926.

[4] *Zs. f. Phys.*, **74**, 63, 1932.

[5] *Sci. Papers Inst. Phys. Chem. Res., Tokyo*, **18**, 177, 1932.

[6] *Zs. f. Phys.*, **72**, 423, 1931.

[7] *Zs. f. Phys.*, **73**, 306, 1931.

[8] *Zs. f. Phys.*, **77**, 801, 1932.

[9] *Zs. f. Phys.*, **77**, 746, 1932.

as shown in Fig. 1 on the basis of the scheme proposed by the author and T. G. Srinivasa Iyengar. This scheme is also able to account for the structure of 5026 ($6^1P_1 -$ 8^3S_1) given by Venkatesachar and Sibaiya[10] as shown in Fig. 2. The scheme of Schüler and Jones cannot be reconciled with this structure. Fig. 3 shows the structure of
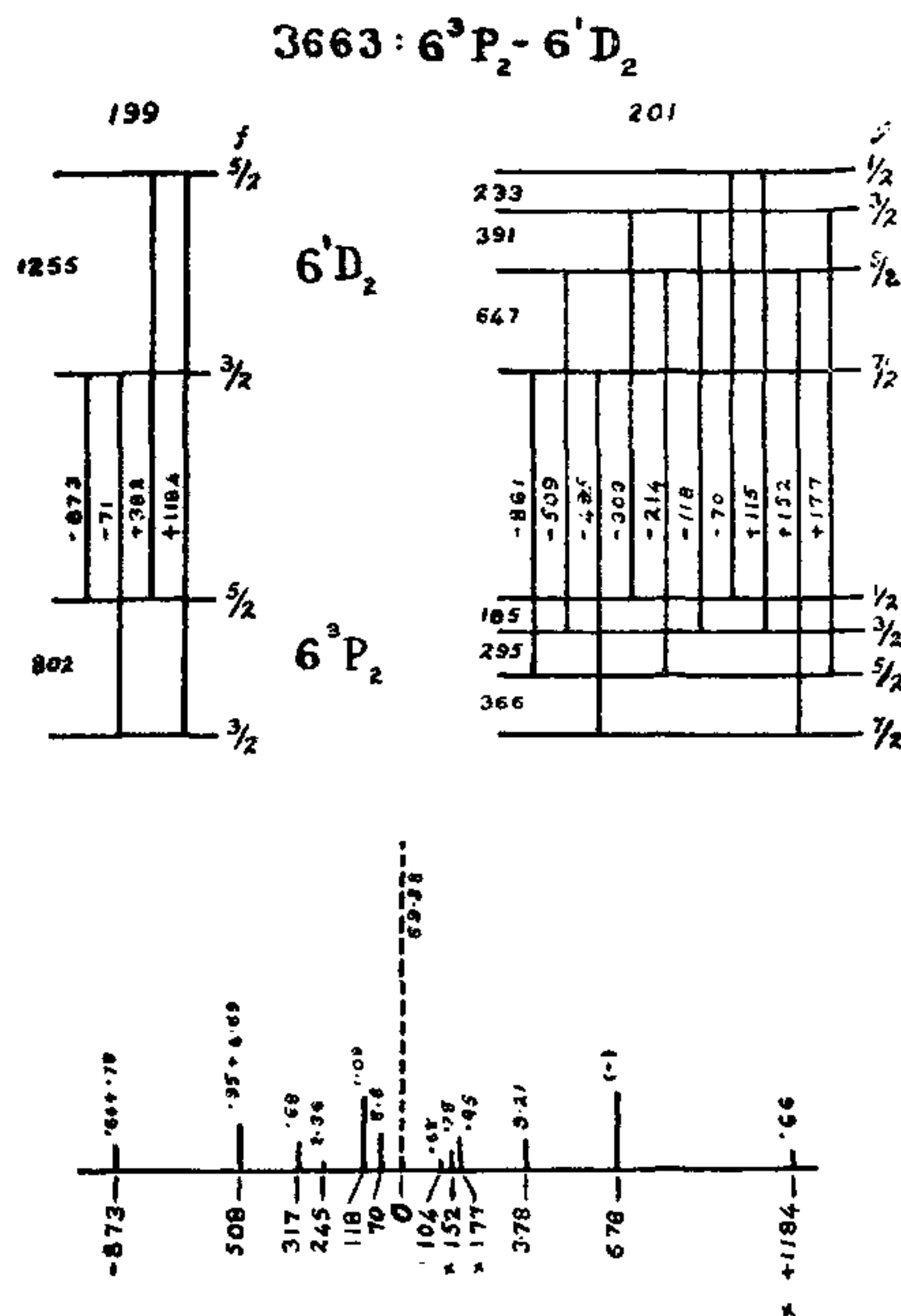

Fig. 3.

3663 ($6^3P_2 - 6^1D_2$) deduced from that of the 6^1D_2 level given in the previous paper.[2] Unfortunately the diagram given in that paper for 3663 shows the levels upside down owing to inadvertence in copying from the rough manuscript. The positions of the satellites now given agree with the measurements of Nagaoka although the intensities are not so well explained. The structure deduced by Schüler and Jones is markedly different from that given by Nagaoka.

It is remarkable that the structures of some lines in regard to which earlier observers were in substantial agreement differ materially from the results of later investigators. The situation is equally puzzling in

the case of lead. Thus Wali Mohammad and Sharma[11] obtain results exactly coinciding with those of previous observers like Janicki while in many cases the results of Kopfermann[12] and the similar ones of Rose and Granath[13] differ markedly from these. It is not easy to make self-reversal and absorption alone responsible for such contrary results. Unless the causes of this discrepancy between the results of equally reliable observers are found out and allowed for, the problem of hyperfine structure will remain without a unique solution.

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Size of the Liquid Drops on the Same Liquid Surface.

IN the previous papers the author has studied the general accounts of the liquid drops on the same liquid surface,[14] the effect of the surrounding medium on the life of liquid drops[15] and water as a suitable liquid for the formation of such drops.[16] Now the author has studied the factors which increase their size and has arrived at the following conclusions :—

1. That the size of the floating drops depends upon two factors, viz., (a) the diameter of the burette and (b) the surface tension of the mother liquid.

2. That the size of the floating drops is independent of (a) the viscosity and (b) the density of the mother liquid.

3. That the surface tension of the mother liquid affects the size of the primary as well as the secondary drops formed by any method.

4. That the diameter of the jet affects the size of only the primary drops formed by burette method. It neither affects the primary drops formed by any other method nor the secondary drops formed by any method.

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Camp—Sundarnagar,
Suket State, India,
September 12, 1932.

10 *Naturwiss*, **19**, 1041, 1931.

11 *Phil. Mag.*, **12**, 1106, 1931.
12 *Zs. f. Phys.*, **75**, 363, 1932.
13 *Phys. Rev.*, **39**, 1017, 1932.
14 J. B. Seth, C. Ananda and L. D. Mahajan, " Liquid Drops on the Same Liquid Surface," *Phil. Mag.*, **7**, pp. 247-253.
15 L. D. Mahajan, " The effect of the surrounding medium on the life of liquid drops, " *Phil Mag.*, **10**, pp. 383-386.
16 L. D. Mahajan, " Liquid Drops on the Same Liquid Surface," *Nature*, **126**, p. 761; **127**, p. 70.