fessor Gerhardt and Generaloberartzt Schjerning, of Berlin; (4) 'Therapy,' by Professor von Ziemssen, of Munich, and Professor Schroetter, of Vienna; (5) 'Sanitaria,' by Herr Gaebel, President of Imperial Insurance Office, Berlin, and Dr. Dettweiler, of Falkenstein.

Following the presentation of the two leading papers (limited to 20 minutes each) in the respective divisions, there will be a general discussion, speakers being limited to 10 minutes each. All papers and remarks are to be in German, although the chairman is empowered to make exceptions during the general discussion.

All persons interested in the subject of tuberculosis are eligible for membership; membership cards (20 Marks, nearly $5) are to be obtained at the office of the Congress ('Bureau des Organisations-Komites, Wilhelm Platz 2, Berlin, W') and entitle the holder to a copy of the 'Proceedings.' An early registration is requested.

The writer has been requested to furnish a list of Americans to whom special invitations to the Congress should be sent. He has complied with this request, so far as his personal and professional acquaintance with specialists in this line has permitted, and has also suggested to the committee that invitations be sent to the various medical societies and faculties. There are undoubtedly many American practitioners especially interested in tuberculosis and possibly some laboratory workers whom he has overlooked. Should any such person desire to attend the Congress, yet prefer to receive a personal invitation, the writer will be pleased to forward the name of such persons, upon proper introduction, to the Executive Committee of the Congress. As 'proper introduction' will be considered a letter from any recognized medical, scientific or veterinary faculty or society.

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ASTRONOMICAL NOTES.

THE RUTHERFURD PHOTOGRAPHS.

Among recent additions to the literature of the astronomy of precision are four contributions from the Observatory of Columbia University which give the results of measurements of the Rutherfurd plates. Dr. Davis contributes three of these, entitled 'Catalogue of Sixty-five Stars Near 61 Cygni,' 'The Parallaxes of 61^1 and 61^2 Cygni,' 'Catalogue of Thirty-four Stars near Bradley 3077.' Mr. Schlesinger contributes the fourth, upon 'The Præsepe Group.' All these are most admirable illustrations of the highest type of astronomical work in the determination of exact positions of the stars, and careful deductions therefrom. No pains have been spared to make the original measures under such conditions that the instrumental constants shall be well determined, and all corrections and reductions accurately applied. The result is three catalogues of stars whose coordinates relative to the reference star in each group are determined with great precision. The two catalogues of stars near 61 Cygni and Bradley 3077 are for the purpose of discussing the parallaxes of these well-known stars. The most interesting result of Dr. Davis's discussion is the well-marked difference of parallax between 61^1 and 61^2 Cygni, determined from both position angles and distances, the numerical amount of which is $0''.072 \pm 0''.028$. This large difference, if real, explains the failure of double-star observers to detect any evidence of orbital motion, and would show that the stars do not form a binary system. A confirmation of this conclusion is found in a careful discussion of Wilsing's determinations of the distance of these two stars, which gives $0''.0876$ for the difference. The mean of the different determinations of parallax for the stars made by other astronomers shows a difference of $0''.082$, which confirms further the reality of the result. The author urges the making of a more extended series of comparisons by photography to give further evidence on this subject.

An interesting result of Mr. Schlesinger's study of the measures of the Præsepe stars is that the method of orienting the plate by the method of trails is not as accurate as that ba ed upon assuming the coordinates of several comparison stars on the plate, as determined by the meridian circle or the heliometer. It was Mr. Rutherfurd's rule to make two impressions of the regions photographed, stopping the clock for a few seconds between them, and also to give a third impression of the brightest stars by stopping the clock about three minutes and

making a brief exposure. In this way each plate contains its own data for orientation. The author thinks that the somewhat large discrepancies between this method and that by meridian circle observations is due to the jarring of the plate by stopping and starting the clock. Its value as an independent method, however, is recognized.

THE SOLAR ECLIPSE OF MAY 28, 1900.

THE committee appointed at the recent conference of astronomers and astrophysicists to consider the observations to be made at this eclipse has issued a circular letter asking for opinions as to the observations deemed advisable and what cooperation our American astronomers can render. The eclipse path extends from the Gulf coast to the Atlantic, but the duration of totality is short, only 1^m 13^s near New Orleans and 1^m 40^s near Norfolk, Va., according to the circular. The figures given by the circular of the English Nautical Almanac are a few seconds larger than these, 1^m $17^s.8$ west of New Orleans, and 1^m $45^s.6$ south of Cape Henry, Va. Some excellent points of observation may be found in Portugal and Spain, where the totality will range from 1^m 34^s to 1^m 19^s. European astronomers are likely to locate at this end of the line. American observers should cover thoroughly the path through the United States, which includes many places readily accessible. The U. S. Weather Bureau has issued a second bulletin upon the probable weather to be expected. This is based upon special reports made in May, 1898, the former report including those of 1897. A third report for 1899 is promised. The conclusion thus far is that the most unfavorable weather is to be expected on the Gulf and Atlantic coasts, and that the most favorable locations are in the northern parts of Georgia and Alabama, upon the southern end of the Appalachian Mountains.

WINSLOW UPTON.

PROVIDENCE, R. I., March 15, 1899.

NOTES ON PHYSICS.

THE EFFECT OF COMMUTATION ON THE FIELD OF DYNAMOS AND MOTORS.

MESSRS. EVERETT AND PEAKE, in a paper on 'The Effect of Commutation on the Field of Dynamos and Motors' in the London *Electrician* of December 30, 1898, find, by means of an exploring coil and instantaneous contact maker, that the effect of commutation is to produce somewhat regularly recurring ripples in the curve connecting E. M. F. and position of the exploring coil, the maximum of the ripples occurring at intervals equal to the width of a coil, decreasing in magnitude as the distance from the commutated coil increases and nearly disappearing before the interpolar gap is passed. These ripples were found to be more marked with narrow than with wide brushes, which is explained by the damping effect of the adjacent short-circuited coils acting as secondaries to each other. The ripples are also more marked for heavy than for light currents and for motors than for dynamos.

TELEGRAPHY AND MAGNETIC INDUCTION.

S. EVERSHED, in an article on 'Telegraphy by Magnetic Induction' in the same journal, deduces a formula for the mechanical energy available in a distant secondary circuit in which no capacity is used, in terms of dimensions, resistance, frequency, etc., and from this calculates that in the case of two circuits using together 1,000 kgm. of wire, each 1,000 meters square and 10 kilometers apart, with a frequency of 100 and 100 watts in the primary, there would be available in the secondary .34 ergs. per second. Experiment shows that 2.9×10^{-6} amp. gives easily readable Morse signals in an ordinary telephone, this being double the audible current (this presumably for a frequency of 400). He then finds that in the above case, but with frequency equal to 400, there is 12×10^{-6} amp., and that hence the readable signals could be produced with 250 kgm. of copper. For satisfactory audible signals the frequency must be at least as high as 400, and here the undetermined effect of absorption of these waves by the material of the earth comes in. If this proves serious it may be necessary to use lower frequencies and other forms of receivers. A receiver is described consisting of a tuned rectangle of wire, vibrating in a strong field, or, better, two rectangles vibrating synchronously, but in opposite directions. Such instruments are being used at Lavernock and Flat Holm as