Special Technical Report 12 – Addendum

SUBJECT INDEX FOR SURVEY OF LITERATURE PERTAINING TO THE EQUATORIAL IONOSPHERE AND TROPICAL COMMUNICATION

By: G. H. HAGN  K. A. POSEY  H. W. PARKER

Prepared for:
U.S. ARMY ELECTRONICS COMMAND
FORT MONMOUTH, NEW JERSEY

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MENLO PARK, CALIFORNIA
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SUBJECT INDEX FOR SURVEY OF LITERATURE
PERTAINING TO THE EQUATORIAL IONOSPHERE
AND TROPICAL COMMUNICATION.

Prepared for:

U.S. ARMY ELECTRONICS COMMAND
FORT MONMOUTH, NEW JERSEY

By: G. H. HAGN, K. A. POSEY, H. W. PARKER

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This addendum is a subject index for Special Technical Report 12 on this contract, DA 36-039-AMC-00040(E), "Survey of Literature Pertaining to the Equatorial Ionosphere and Tropical Communication." The greatest numbers of subjects have to do with equatorial aeronomy, but topics under geomagnetism, jungle radio propagation, radio noise, and special equipment and antennas related to studies in the fields cited are included. The literature search involved documents published over a period of about 40 years, ending with 1964, with the greater weight being placed on work published in the latter years.
This report is a subject index to "Survey of Literature Pertaining to the Equatorial Ionosphere and Tropical Communication," Special Technical Report 12, on Contract DA 36-039-AMC-00040(E). The literature survey in that report is organized alphabetically by the first author's last name and includes a list of the authors represented. While this organization is convenient for those already familiar with the literature of low-latitude aeronomy, the approach is less useful for other readers. The authors think a subject index enhances the value of any literature survey. This index is organized alphabetically by subject. The listings under each subject give the first author's last name and the year of publication. The user is advised to check Special Technical Report 12 for all articles by an author for the year of interest, since no distinction has been made when more than one article appears for any given author in a year.
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Measurements of, in E region (Schlapp 1959)
An attempt to measure, in F region (Schlapp 1960)
Effect of collisions on ionospheric propagation (Titheridge 1961)

ELECTRON DENSITY

Total, and anomalies (Altman 1963)
Equatorial, in F2 layer (Appleton 1954)
In the F layer of the ionosphere (Bandyopadhyay 1960)
Near Delhi and Calcutta (Banerjee 1946)
Cause and effect in the F2 region (Bannon 1946)
Effect of meteoric shower on (Bhar 1937)
From Faraday fading (Blackband 1960)
Studies of the electron content of the equatorial ionosphere (Binnie 1961, 1962)
Equatorial profiles to 5000 km (Bowles 1962)
Over the magnetic equator (Bowles 1962)
Diurnal variation of F2 layer, at equatorial stations (Byfrig 1950)
The effect of diffusion on, in the F region (Goldberg 1962)
Distribution near the magnetic equator (Goldberg 1962)
Geomagnetic control of, in F region of ionosphere (Goldberg 1963)
Effect of diffusion on, in F region near magnetic equator (Goldberg 1963)
Analysis of, at Leopoldville–Biafra (Herrinck 1960)
Mean temporal variations of, at a fixed height in the F region (Hirsh 1962)
F2-layer, and solar corpuscular activity (Lal 1963)
Determination of the available frequency range considering (Lied 1947)
ELECTRON DENSITY (Continued)

Distribution of electrons in the night-time ionosphere (Long 1962)
In F2 layer, world-wide distribution of (Mariani 1959)
Direct measurement of, in a satellite up to one earth radius (McInerney 1964)
F-region, from circuit measurements (Nisbet 1960)
Practical determination of electron content below \( N_{\text{max}} \)
(Osborne, B. W., 1952)
Electron content of F2 layer above Singapore (Osborne, B. W., 1953)
Distribution in ionosphere over Trivandrum (Rao, C. S. R., 1961)
Studies of the geomagnetic anomaly during sunspot minimum (Rao, C. S. R., 1962)
Total electronic content in F2 layer over Madras, 1959 (Rao, C. S. R., 1962)
Distribution of ionization about magnetic equator (Ross 1963)
Diurnal and annual variation of equatorial electron content (Ross 1963)
At Washington, D.C., Panama, Talara, and Huancayo (Schmerling 1958, 1959, 1960)
In E layer over Bengal (Sen Gupta 1936)
Total electron content of F region over Ahmedabad (Sheriff 1956)
Profiles, comparison for low and high solar activity, in Ahmedabad (Shirke 1963)
Spread F and F layer (Singleton 1962)
Some features of F-region density and height variation in equatorial region (Somayajulu 1963)
Ionization below nighttime F layer (Titheridge 1959)
Ionization of Kennelly-Heaviside layer at Allahabad (Toohnival 1935, 1936)
On variations of, in middle latitude F2 layer (Yonezawa 1959)

EMISSION (see AIRGLOW)

EQUATORIAL ANOMALY (see ANOMALIES)
EQUATORIAL IONOSPHERE (see also TRANSEQUATORIAL)

Anomalous belt in F2 (Appleton 1954)
Anomalies in F2 layer (Appleton 1960)
Geomagnetic nature of F2-layer longitude effect (Bailey 1948)
Propagation experiment (Barghausen 1962)
HF propagation characteristics in equatorial latitudes (Barghausen 1963, 1964)
Magnetic field (Ben 'Kova 1962)
E layer (Ben 'Kova 1963)
Ionospheric effects (Bennington 1960)
Airglow observations near (Blackwell 1960)
Satellite observations of (Blumle 1961, 1962)
NBS VHF scatter research (Bowles 1957)
Differs from mid-latitudes (Bakin 1961)
Special problems in using HF reflections from (CCIR 1963)
Equatorial spread F (Lyon 1958, 1960, 1961)
F2 region during sunspot maximum (Lyon 1963)
The equatorial F region (Norton 1961)
A waveguide interpretation of spread F in (Pitteway 1961)
Trough found in theoretical form of F layer, near magnetic equator (Rishbeth 1963)
Research engineering and support for tropical communication (Vincent 1963)
Equatorial spread F (Wright, R. W., 1959)

EQUATORIAL E_s (see SPORADIC E)

EQUATORIAL TROUGH (see ANOMALIES)
EQUIPMENT (see also ANTENNAS)

Polarimeter for LF echoes (Benner 1950)
Sweep-frequency instruments for studying irregularities (Briggs 1951)
Low-power ionosondes (Busch 1963)
Rotating aerial backscatter sounder (Clemesha 1962)
A panoramic ionospheric recorder for study of ionospheric traveling disturbances (Heisler 1955)
Tropical receiver design (Lemmon 1941)
A modified Hammerlund Super-Pro communication receiver for pulse measurements of the ionosphere (Mitrr, S. N., 1951)
Peak amplitude recorder for investigation of fading (Mazumdar 1954)
Design and development of simple ionospheric sounding equipment (Murty 1956)
A new type of ionospheric drift recorder (Rao, B. R., 1961)
The vector-field proton magnetometer for IGY satellite ground stations (Shapiro 1946)
Instrumentation for observation of field-aligned F-region irregularities and transequatorial radio propagation (Thomas 1962)
Tests of HF transceivers for use in a tropical forest (Vincent 1963)
Detection of rapidly moving ionospheric clouds (Wells 1946)

E REGION (see also E1 LAYER; E2 LAYER; Sq CURRENT; SPORADIC E)

Sq current systems and (Appleton 1955)
Studies of (Appleton 1961)
At low latitudes (Ben 'Kova 1963)
Abnormal ionization of (Berkner 1937)
Geomagnetic distortion of (Beynon 1959)
Variation of height of F2 peak due to nighttime E layer (Bonnet 1954)
Field-aligned irregularities in (Bowles 1963)
Solar control of, at high latitudes (Chatterjee 1954)
Transient fine structure of (Dieminger 1959)
Influence of solar eclipse 25 February 1952 on, in equatorial Africa (Estrabrod 1953)
Seasonal and latitude variations of drifts in (Henderson 1962, 1963)
Magnetic variations in equatorial regions and conductivity of (Hirono 1952, 1953)

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E REGION (Continued)

Reflection and transmission in (Khastgir 1960)
Measurement of normal critical frequencies at night (Piggott 1955)
A continuous-wave method of studying critical frequency variation of (Rao, B. R., 1954)
World-wide study of horizontal drift and anisotropy of irregularities in (Rao, G. L. N., 1963)
Horizontal drifts in, at Waltair (Rao, R. R., 1960, 1961a)
Height gradient of horizontal drift in, over Waltair (Rao, R. R., 1961b)
Study of noon critical frequencies of (Rastogi 1957, 1958)
Intermediate layers between E and F1 over Ahmedabad (Rastogi 1954)
Measurements of collision frequency in (Schlapp 1959)
Effect of Sq current system on (Shimazaki 1959)
Critical frequency observations at Huancayo (Wells 1934)

E_s (see SPORADIC E)

EXOSPHERE

Symposium on (Hines 1960)
Propagation experiments in, at Brisbane (Thomas 1962)
A possibility of long-distance HF propagation along field-aligned ionizations in (Obayashi 1959)

EXTRAORDINARY RAY

Use of, in analysis of ionospheric records, to study region between E and F (Titheridge 1959)
FADING (see also FLUTTER FADING)

Correlation between frequency-selective fading and multipath (Ames 1963)
Correlation bandwidth, for transauroral path (Auterman 1962)
Of radio waves reflected from ionosphere at oblique incidence (Awe 1961)
Of radio waves weakly scattered at 90 km vertical incidence (Awe 1961)
Slow fading of echo at 150 km near equator (Balsley 1964)
Space diversity and (Bannerjee, S. S., 1946, 1948)
Periodic or rhythmic (Bannerjee, S. S., 1948)
Equatorial ionospheric effects (Bennington 1960)
Rate of VHF fading, equatorial electrojet and $E_s$ (Bowles 1960)
Analysis of observations on spaced receivers (Briggs 1950)
Allowances for, in tropical broadcasting (CCIR 1963)
Statistical analysis of, for a single downcoming wave (Das Gupta, P., 1960)
Of ionospheric signals (Flood 1954)
Correlation analysis of vertically reflected radio waves (Fooks 1961)
HF Non-reciprocity and polarization fading (Jull 1962)
Of 108-Mc/s wave from satellite observed at equatorial station (Kent 1961)
Of downcoming wireless waves from the ionosphere (Khastgir 1940)
Random motions of ionosphere irregularities and (Mitra, S. N., 1957)
Random, horizontal drifts in relation to (Rao, E. B., 1961)
Long-period fading in medium radio signals at Waltair (Rao, M. S., 1955)
Investigation of magneto-ionic fading in oblique incidence wave transmissions (Rao, M. S., 1958)
Of CW signals, as a means of spread-F study (Rao, M.S.V., 1960)
Rapid, peculiar type of, in radio reception (Rao, N.S.S., 1949)
Defraction from ionosphere and (Ratcliffe 1948)
Historical survey of, at MF and HF (Salaman 1962)
Ionospheric height measurements in eastern Bengal by method of (Sen Gupta 1936)
Rates of fading of reflected pulses, vertically incident at Ahmedabad (Sethuraman 1958)
FADING (Continued)

On long-distance oblique-incidence pulse circuit on 20.1 Mc/s (Silberstein 1958)
Periodic, particular type of (Singh, B. N., 1958)
Rhythmic, of short-wave radio signals (Singh, B. N., 1959)
Variation of rate of, with frequency (Singh, B. N., 1960)
Effect of radio "fade-out" on F2 layer (Suryanarayana 1962)
Rapid frequency analysis of fading radio signals (Watts 1960)
New type of, on transequatorial circuits (Yeh 1958)
Attenuation of HF waves propagated over long paths crossing auroral,
temperate, and equatorial zones (Yeh 1960)

FARADAY EFFECT (see also SATELLITE)

Data used to infer scale height (Bauer 1960)
Determination of electron content (Blackband 1960)
On satellite radio transmissions (Blumle 1961)
From satellite observations of the equatorial ionosphere (Blumle 1962)
And its applications (Daniels 1959)
Near the transverse region of the ionosphere (Dulk 1963)
Effect of, on incoherent backscatter (Millman 1961)
Second-order Faraday rotation formulas (Yeh 1960)

FIELD-ALIGNED IRREGULARITIES (see also IRREGULARITIES; SPORADIC E)

Radio echoes from near magnetic equator (Bowles 1960)
Identified with acoustic plasma waves (Bowles 1963)
Equatorial spread F and (Calvert 1961)
Doppler studies of (Calvert 1962)
Evidence for, between 400 and 1000 km (Calvert 1963)
Observed on topside sounder (Calvert 1963)
Geometry of radio reflections from (Dearden 1961)
Echoes from, observed at Brisbane (Dearden 1962)
Anisotropic, near the magnetic equator (Egan 1960)
Plasma instability resulting in (Farley 1963)
In the Es region (Goodwin 1962, 1963)
FIELD-ALIGNED IRREGULARITIES (Continued)

Radio echoes from, at magnetic equator (Ireland 1962)
Survey of observations of, from Brisbane (Matthew 1961)
Further results of observations of, from Brisbane (Matthew 1962)
Radar observations of, during magnetically disturbed days (Matthew 1962)
Field-aligned irregularities (Ratcliffe 1963)
Scintillation of satellite transmissions and (Singleton 1961)
Irregularities, final report (Thomas 1962)
Instrumentation for observation of (Thomas 1962)

FIELD STRENGTH

Calculation for tropical broadcasting (CCIR 1963)
Measurements over path Tripoli-Accra (Davies 1962)
Calculation of, at HF (Laitinen 1950)
Analysis of sky-wave field intensity (Mitra, S. N., 1955)
Calculation of median sky-wave in tropical regions (Piggott 1959)
Related to atmospheric humidity (Rao, N. S. S., 1950)
Measurements of, during solar eclipses at Ahmedabad (Rastogi 1955, 1956)
Longwave, effects from distant nuclear detonation (Saha 1964)

F LAYER (see also F1 LAYER; F2 REGION)

Relation to anomaly in total content (Altman 1963)
A study of (Bajpai 1938)
Further studies of, at Allahabad (Bajpai 1939)
Decay of ionization below, at night (Bandyopadhyay 1961)
Observations of spread echoes from (Bhargava, B. N., 1958)
Scattering of radio waves by (Booker 1938)
Phenomena of, at Tsumeb, South West Africa (Dleminger 1960)
Convective diffusion in, equatorial (Dungey 1956)
Gyrofrequency in, over Hobart, Tasmania (Ellis 1957)
Theories of (Fejer 1963)
F LAYER (Continued)

Early-morning variation of ionization of true height of (Ghosh, S. P., 1940)
Effect of diffusion on equilibrium electron-density distribution in, near the magnetic equator (Goldberg 1962, 1963)
Method of estimating collision frequencies in (Hargreaves 1963)
Mean temporal variations of electron density at fixed height in (Hirsh 1962)
Height of nighttime irregularities in, at equator (Kent 1961)
Equatorial study of irregularities in (Kent 1963)
The size of moving irregularities in (Kastgir 1960)
Solar effects in (K Gst 1962)
Effect of magnetic activity and F-region height change on equatorial spread F (Krishnamurthy 1963)
Bifurcation in, at Baguio (Marasigan 1958)
Lunar tidal variations in, near magnetic equator (Martyn 1947)
Latitude effect of oxygen red line of night air glow and its relation with (Nakamura 1961)
Electron density in, from rocket measurements (Nisbet 1960)
Horizontal movements of ionization in, equatorial (Osborne, B. W., 1955)
Studies of, equatorial (Rao, B. C. M., 1962)
Traveling disturbances in (Rao, E. B., 1961)
Rates of production and loss of electrons in (Ratcliffe 1956)
Theory of (Ratcliffe 1963)
Diffusion in, equatorial (Rishbeth 1963)
An attempt to measure collision frequency in (Schlapp 1960)
Total electron content of, over Ahmedabad (Sheriff 1956)
Scatter in, and cosmic radio noise on 25 Mc/s at Ahmedabad (Shirke 1962)
Magnetic field of, from h'f records (Singh, R. N., 1962)
Spread F and parameters of (Singleton 1962)
Multiple stratifications of, at Ibadan (Skinner 1954)
Evidence on horizontal diffusion along magnetic lines of force in, equatorial (Somayajulu 1964)
Ionization below, at night (Titheridge 1959)
F LAYER (Continued)

Seasonal anomaly of (Wright, J. W., 1963)

F1 LAYER

Small (5%) diurnal variation of $f_0 F1$ and virtual height of, at Huancayo (Beckner 1934)
Solar control of, at high latitudes (Chatterjee 1954)
Stratification of, at Dakar, French West Africa (Delobeau 1952)
Effect of geomagnetism on (Eyfrig 1955)
Global characteristics of separation between F1 and F2 layers (Ghosh, M. 1953)
Study of horizontal drifts in F1 and F2 regions at Waltair (Rao, B. R., 1959)
Diurnal variations of (Rao, E. B., 1961)
Intermediate layers between E and F1 over Ahmedabad (Rastogi 1954)
Geomagnetic influences on, at different stages of solar activity (Rastogi 1959)
Effect of Sq current system on (Shima^aki 1959)

F 1.5 LAYER (see also ECLIPSE)

At Dakar, and motion of sun (Delobeau 1952, 1954)
Eclipse effect on F region in equatorial Africa (Estrabaud 1952)
Discussion on the F 1.5 layer of the ionosphere (Kotadin 1957, 1963)
Comparison of results of ionospheric soundings in equatorial Africa (Lejay 1956)
Eclipse effect in the F2 layer (Wells 1946)

F2 LAYER (see F2 REGION)

FLUTTER FADING (see also FADING; SPRE'D F)

Rise of F layer at sunset (Appleton 1960)
Equatorial ionosphere propagation experiment (Barghausen 1962)
Study of radio propagation characteristics in equatorial ionosphere (Barghausen 1963)
FLUTTER FADING (Continued)

HF propagation characteristics in equatorial latitudes (Barghausen 1963)

HF propagation via equatorial ionosphere (Barghausen 1964)

Equatorial ionospheric effects: post-sunset fading on long-distance radio circuits (Bennington 1960)

Variations in fading over UK/Singapore and UK/Johannesburg broadcast circuits (Bennington 1960)

Caused by equatorial spread F (Calvert 1962)

Equatorial sunset effect (Humby 1959)

Measurements on sunset fading effect (Koster 1963)

Time of onset of spread F in relation to post-sunset HF variations (Krishnamurthy 1963)

Connection with spread echoes, magnetic storms, and the radiation belt (Lal 1960)

Ionospheric conditions that may affect tropical broadcasting services after sunset (Osborne, B. W., 1952)

Post-sunset rise of \( f_{F2} \) and dependence on post-sunset rise of \( H'F \)

Equatorial spread F, in relation to post-sunset changes in magnetic activity (Rao, M. S. V. G., 1963)

Peculiar type of rapid fading (Rao, N. S. S., 1949)

Observation at VHF (Southworth 1960)

Equatorial flutter-fading observations (Stiltner 1963)

Relation to equatorial spread F (Wright, R. W., 1959)

F2 REGION

Diurnal variations in (Allen 1953)

Studies of (Appleton 1950)

Morphology of ionospheric storms in (Appleton 1952)

Anomalous equatorial belt in (Appleton 1954)

Anomalies in F2 layer of (Appleton 1960)

Geomagnetic nature of (Briley 1948)

High multiple radio reflections from (Baird 1954)

Recording ionospheric echoes from (Bajpai 1936)
F2 REGION (Continued)

A study of diurnal variation of critical frequencies of (Bajpai 1938)
Studies of, at Allahabad (Bajpai 1939)
Electron distribution in (Bandyopadhyay 1960)
Cause and effect in (Bannon 1946)
Abnormalities in (Baral 1948)
Lunar tidal variations in (Baral 1956)
Twenty-seven-day variations in, at Huancayo (Bartels 1950)
IGY observations in, Far East (Batemen 1959)
Variation in the critical frequency of (Bazzard 1961)
Drift measurements in, at Kjeller (Becken 1960)
And ionospheric critical frequencies (Bergh 1961)
And time lag between magnetic and ionospheric change (Bergh 1962)
And ionosphere investigation (Berkner 1934)
Ionization in, and magnetic dip (Bhar 1957)
A study of noon ionization in (Bhar 1959)
Annual wave in (Bhargava, B. N., 1959)
Distortion of, in the equatorial ionosphere (Bhargava, B. N., 1962)
Fluctuation of ionization in (Bibl 1963)
Peculiarity in, at Lwiro (Bonnett 1954)
Lunar semidiurnal variations of (Bossolasco 1960)
Variations in ionospheric characteristics of (Briggs 1958)
Lunar variations of (Brown, R. A., 1956)
Studies of height oscillations in (Burkard 1950)
Electron annihilation in (Burkard 1950)
Studies of ionospheric tidal effect in (Burkard 1951)
Comments on geomagnetic effect in (Burkard 1954)
Instability of, equatorial F-layer after sunset (Calvert 1963)
Geomagnetic time variations (Chakrabarty 1946)
Vertical transport of electrons in (Chandra 1960)
Ionization distribution in (Chatterjee 1954)
Regularities in (Chatterjee 1954)
Backscattering of radio waves from, equatorial (Clemesha 1963)
F2 REGION (Continued)

Anomalies in behavior of (Croom 1959)
Ionospheric observations during April 19, 1958 eclipse (Datta, S., 1959)
Study of, with Doppler technique (Davies 1962)
The equatorial (Duncan 1960)
Effects of 25 February 1952, solar eclipse on, in equatorial Africa (Estrabaud 1952)
Diurnal variation of electron density of, at equatorial stations (Eyfrig 1950)
On height of (Eyfrig 1952, 1956)
Equator of (Eyfrig 1962)
Effect of magnetic declination on (Eyfrig 1963)
Lunar stratification of, at Huancayo (Gautier 1951)
Determination of collision frequency in (Ghosh, M., 1956)
Theoretical world curves of maximum ionization of (Gliddon 1961)
Mathematical model of (Gliddon 1962)
On ionization of (Goodall 1937)
The solar cycle and (Goodall 1939)
Geomagnetic distortion in, its nature and origin (Hasegawa 1954)
Interpretation of F2 critical frequency measurements of (Heisler 1961)
Analysis of electron density of, at Leopoldville-Binza (Herrinck 1960)
Symposium on (Hines 1960)
Geomagnetic distortion of, on the magnetic equator (Hirono 1954)
Effect of gravity and ionization pressure gradient in the vertical drift in (Hirono 1955)
Characteristics of, on the magnetic equator (Hirono 1955)
Geomagnetic distortion of, on the magnetic equator (Hirono 1955)
The latitudinal effect on the disturbance daily variation in (Kamiyama 1956)
During sunspot minimum over Ahmedabad, Delhi, and Tiruchirapalli (Kotadia 1956)
Lunar tidal variations of midday critical frequencies of, in low latitudes (Kotadia 1962)
Magnetic storm of 11 February 1958 and associated changes in, at low latitude (Kotadia 1962)
During eclipse, at Huancayo (Leddig 1946)
Vertical movement of, at Huancayo (Lewis 1953)
Ionization of, and geomagnetic latitude (Liang 1947)
Horizontal diffusion and the geomagnetic anomaly in (Lyon 1962)
Equatorial anomaly in, during sunspot maximum (Lyon 1963)
Disturbance, daily variation and the lunar daily variation in, on magnetic equator (Maeda, H., 1955)
Geomagnetic distortion of, on magnetic equator (Maeda, H., 1959)
Variation of, associated with geomagnetic variation (Maeda, K., 1952)
Theoretical study on the geomagnetic distortion in (Maeda, K., 1955)
Geomagnetic distortion in (Maeda, K., 1955)
Geomagnetic anomalies of, and their interpretation (Martyn 1955)
A survey of some problems concerning (Martyn 1962)
Variations of, associated with geomagnetic disturbances at the equatorial zone (Matsushita 1955)
Graphical representation of longitudinal effect in (Minnis 1952)
Geographical distribution of ionization in (Minnis 1960)
Geomagnetic control of (Mitra, S. K., 1946)
Ionospheric behavior in F2 region in Singapore (Osborne, B. W., 1951, 1955)
Lunar variation of $f_{o}$ F2 in, at Singapore (Osborne, B. W., 1952)
Practical determination of electron content below $N_{max}$ in (Osborne, B. W., 1952)
Electron content of, above Singapore (Osborne, B. W., 1953)
Daily index of F2-layer disturbance during IGY (Piggott 1960)
A wave-guide interpretation of, for spread F on equatorial ionograms (Pitteway 1961)
Ionospheric drift in, near magnetic equator (Purslow 1958)
Horizontal drifts in, at Waltair (Rao, A. S., 1963)
Effects of enhanced solar activity on drifts in, at Waltair (Rao, B. R., 1958)
Horizontal ionospheric drifts in, at equatorial latitudes (Rao, B. R., 1958)
Solar tidal effects in, over Delhi (Rao, C.S.R., 1957)
Total electron content in, over Madras 1959 (Rao, C.S.R., 1961)
F2 REGION (Continued)

Study of geomagnetic anomaly in \( F_2 \) during sunspot maximum (Rao, C.S.R., 1962)

World-wide study of horizontal drift in \( F_2 \) (Rao, G.L.N., 1964)

Geomagnetic influences on, at different states of solar activity (Rastogi 1956)

Type of development of, at Ahmedabad (Rastogi 1956)

Asymmetry between hemispheres in \( F_2 \) (Rastogi 1960)

A synoptic study of, in Asian zone (Rastogi 1960)

Some effects of geomagnetic activity on (Rastogi 1961)

Lunar tide in, near equator (Rastogi 1961)

Effect of geomagnetic activity on, over central Africa (Rastogi 1962)

Longitudinal effect in, equatorial (Rastogi 1963)

Seasonal variations of lunar tidal effects in, over India (Rastogi 1963)

Some regularities in (Ratcliffe 1951)

Properties of (Roberts 1963)

Geomagnetic distortion of, at equatorial latitudes (Sarma 1956)

Disturbances in, associated with geomagnetic storm (Sato 1956)

Dynamical structure of, as deduced from world-wide daily variations (Shimazaki 1959)

Irregularities in, at Ibadan (Skinner 1954)

Some geomagnetic effects in, equatorial (Skinner 1955)

Effect of equatorial electrojet on (Skinner 1957)

Magnetic field in, at Dakar (Suchy 1956)

"Fade-out" (sic. Suggest "blackout" (ld.)) of (Suryanarayana 1962)

Photochemical rates in, equatorial, from 1958 eclipse (Van Andt 1960)

Eclipse effects in (Wells 1946)

New theory of formation of (Yonezawa 1956)

Behavior of, during severe magnetic storms (Yonezawa 1963)

Time and distance correlation study of ionosonde data (Zacharisen 1963)
FOCUSING (see also HORIZON FOCUSING)

Horizon (Thomas 1962)

Of radio waves, by $E_s$ clouds (Umlauft 1960)

$f\ F_2$ (see also VERTICAL INCIDENCE)

Near-relationship to sunspot number (Alien 1946)

Regional anomalies in (Aono 1953)

Latitude dependence of, over the range 20° north to 69° south obtained by ship-borne ionospheric sounder (Ose 1959)

In quiet-day vertical cross sections of the ionosphere along 75° W geographic meridian (Wright, J. W., 1959)
GENERAL IONOSPHERE

Early determination of ionospheric height (Jansal 1936)
Ionosphere research (Beagley 1952)
True ionospheric height (Becker 1959)
Tropical upper air studies (Belmont 1962)
Characteristics of the upper region (Berkner 1936)
Amplitude and phase spectrum (Bhattacharya 1963)
Total reflection of electromagnetic waves (Bose 1938)
Terrestrial Radio Waves (Bremmer 1949)
Electron density over Atlantic Ocean (Bukin 1961)
Electrical conductivity (Cowling 1963)
Ionospheric data (CSIR 1962, 1965)
Anomalous amplitude of seasonal effects in the equatorial ionosphere (Delobeau 1954)
Radar methods of study (Evans 1962)
Discussion about special ionosphere characteristics: MUF (3000) $f_{F2}$ related to solar activity (Eyfrig 1937)
Pressure and temperature equalization at 200 kilometers (Johnson 1960)
Short-wave communication (Lied 1947)
Distribution of electrons at night (Long 1962)
Ionospheric data (NBS 1955)
Ionosphere at Allahabad (Pant 1936)
Soft corpuscular radiation at 320 kilometers near magnetic equator (Savenko 1962)
Rate of electron production in ionosphere (Seaton 1947)
Physics of fully ionized gases (Spitzer 1956)
A method of solving integral equations for the vertical propagation of time-harmonic plane waves in anisotropic vertically inhomogeneous nonmagnetic media (Tumlinson 1958)
Model (Woodward 1948)
Ionospheric data: Woomera, Australia (WRE 1963)

GEOMAGNETISM

Solar and lunar diurnal variation of (Chapman 1919)
Influence of earth conductivity on (Chapman 1922)
GEOMAGNETISM (Continued)

Geomagnetism (Chernosky 1961)
Effect on F1 layer (Eyfrig 1955)
Daily variations of the electrical conductivity of the upper atmosphere as deduced from the daily variations of (Maeda, H., 1955)
Activity and spread F (Rao, C. V. S., 1962)
Control of ionosphere-geomagnetic influences on F1 and F2 regions (Rastogi 1956)
Effects of, activity on F2 region over Leopoldville (Rastogi 1961)
Effect of, on F2 region over Central Africa (Rastogi 1961)
Effects in equatorial F2 region (Skinner 1955)

GEOMAGNETIC ANOMALY (see ANOMALIES)

GEOMAGNETIC CONTROL OF IONOSPHERE (see also FIELD-ALIGNED IRREGULARITIES: LUNAR TIDE)

Control of F2-layer ionization (Appleton 1947, 1950)
Ionospheric storms and the F2-layer anomaly (Appleton 1953)
Anomalous equatorial belt in F2 layer (Appleton 1954)
Regularities and irregularities and (Appleton 1956)
Equatorial anomalies in the F2 (Appleton 1960)
Geomagnetic nature of F2 longitude effect (Bailey 1948)
Abnormalities in F region at Calcutta (Baral 1948)
Ionospheric critical frequencies and magnetic parameters of preceding day (Bergh 1961)
Distortion of F region (Beynon 1959)
Noon F2 ionization and geomagnetic coordinates (Bhar 1959)
Influence of disturbed conditions and increased solar activity (Bhargava 1962)
Control on F2 layer (Burkard 1954)
Control of equatorial F2 layer (Chakrabarty 1946)
Anomalies in behavior of F2 layer (Croon 1959)
Control of the F1 layer (Eyfrig 1955)
Effect on the F2 region (Eyfrig 1963)
Distortion of the F2 region near the magnetic equator (Hirono 1954)
GEOMAGNETIC CONTROL OF IONOSPHERE (Continued)

Control of diffusion in the F2 region (Kendall 1962)
The relationship between \( f_{\text{F2}} \) and magnetic phenomena (King 1962)
Relationships between magnetic and ionospheric variations (King 1963)
F2 ionization and geomagnetic latitudes (Liang 1947)
Of high-altitude nuclear explosions (McNish 1959)
Control of F2 region (Mitra, S. K., 1946)
Control of F2 region at equatorial latitudes (Sarma 1956)
TRANSEQUATORIAL BACKSCATTER OBSERVATION OF MAGNETIC EFFECTS (Thomas 1961)

GEOMAGNETIC DISTURBANCES (see also SUDDEN COMMENCEMENT)

Ionospheric variation associated with (Matsushita 1953)
Ionospheric F2 variations associated with, at the equatorial zone (Matsushita 1955)
And interrelations among upper-atmosphere disturbance phenomena over polar regions (Oguti 1960)
Abnormal variation of earth’s field (Rastogi 1961)

GEOMAGNETIC EQUATOR

Variation of horizontal force near (Alexander 1957)
Variation of noon F2 equivalent heights relative to (Appleton 1947)
Some aspects of \( E_s \) ionization of (Bandyopadhyay 1963)
Relation between noon F2-layer ionization and (Ehar 1957)
Electron content at (Blumle 1962)
VHF transmission across (Bowles 1960)
Field-aligned ionization above (Bowles 1960)
Profiles of electron density over (Bowles 1962)
Radio wave scattering near (Bowles 1962)
Vertical-incidence observations at (Bukin 1961)
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In voice tests in a tropical environment (Vincent 1963)

MONROVIA, LIBERIA

Flutter fading on path between Accra and (Barghausen 1962)
Measurements on paths between Monrovia and Accra and Natal (Barghausen 1963)

MUF (see MAXIMUM USABLE FREQUENCY)
MULTIPATH

Correlation between frequency selective fading and (Amen 1963)

MULTIPLE REFLECTIONS

High, from F2 at Brisoane (Baird 1954)
Discrepancies in ionospheric absorptions deduced from (Piggott 1960)
NAIROBI, KENYA

Abnormal variations of earth's magnetic field at (Rastogi 1961)

NATAL, BRAZIL

HF path between Monrovia and (Barghausen 1963)

NATAL, S. AFRICA

Atmospheric super-refraction and anomalous propagation at (Phillips, W. E., 1951)

NEW ZEALAND

Two anomalies in the ionosphere at (Appleton 1946)
Ionospheric research in (Beagley 1952)

NOON MINIMUM (see MIDDAY DECREASE, f F2)

NUCLEAR EXPLOSION

Particle motion in the equatorial plane of the dipole magnetic field (Avrett 1962)
Over Johnston Island observed in Peru (Casaverde 1963)
Of 9 July 1962, magnetic effects in Philippines (Glover 1963)
Of 9 July 1962, and synchrotron radiation decay at equatorial sites (Goldman 1963)
Artificial geomagnetic and ionospheric storms associated with (Matsushita 1959)
Geomagnetic effects of, at high altitude (McNish 1959)
Propagation disturbances caused by (Obayashi 1960)
Observations of synchrotron radio noise at the magnetic equator following (Ochs 1963)
Ionospheric effects of, following distant detonations (Saha, A. K., 1963, 1964)
Magnetic effects of, in France, at the equator, and in the Antarctic, from ARGUS (Selzer 1959)
World-Wide geomagnetic effects of, on 9 July 1962 (Shirgaokar 1962)
Ionospheric effects due to (Utlaut 1959)
OBLIQUE INCIDENCE

Effect of magnetic field over equatorial region (Chatterjee 1952)
Experimental results (Delobeau 1955)
Skip distance of radio waves and propagation of microwave (Hulburt 1935)
Fading of medium wave transmissions at (Rao, M. S., 1958)
Long-distance pulse propagation experiment on 20.1 Mc/s (Silberstein 1958)
Pulse observation near MUF (Somayajulu 1952)
PARABOLIC LAYER METHOD

Application to radio communication (Appleton 1940)

PHASE STABILITY (see also DOPPLER TECHNIQUE)

In VLF propagation measurements for Radux-Omega navigation system (Casselman 1959)
Of 1600-km path (Smith, W. B., 1961)

PHILIPPINE ISLANDS

IGY observation of F-layer scatter (Baileyman '59)

PLASMA (see also ACOUSTIC)

Plasma physics and magnetohydrodynamics--bibliography (Auckland 1962)
Plasma diffusion in the ionosphere (Chandra 1964)
Absorption of radio waves in resonance regions of a nonhomogeneous plasma (Denisov 1959)
Instability and ionospheric irregularities (Farley 1963)

POLARIZATION, WAVE (see also FARADAY EFFECT)

Of Es echoes at Waltair (Abhirama Reddy 1962)
Of HF radio waves observed at low latitude (Abhirama Reddy 1963)
Of Es at low latitude as indicating Es structure (Abhirama Reddy 1963)
Of Z echo at Waltair (Abhirama Reddy 1963)
Theoretical, at Waltair, India (Abhirama Reddy 1963)
Polarimeter for study of low-frequency radio echoes (Benner 1950)
Sensitivity to polarization at HF near magnetic equator (Bowles 1960)
Of VHF echoes at magnetic equator (Bowles 1960)
Importance of, at medium wave near geomagnetic equator (Davies 1964)
Limiting polarization of medium wave from ionosphere (Eckersley 1939)
Of downcoming radio waves near geomagnetic equator (Hagn 1963)
Non-reciprocity fading and (Jull 1962)
Observed at vertical incidence (Morgan 1955)
Parameters, of the downcoming radio wave (Murty 1960)
POLARIZATION, WAVE (Continued)

For vertical propagation (Roy 1955)
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From ionosphere on geomagnetic equator (Wells 1936)
Multiple-frequency recordings of, at Huancayo (Wells 1940)

POONA, INDIA

Atmospheric noise in 3-Mc/s band at (Chandrashekhar Aiya 1955)
Atmospheric noise, 2.5-to-20.0-Mc/s band at (Chandrashekhar Aiya 1959)
Atmospheric noise in standard BC band at (Chandrashekhar Aiya 1959)
Atmospheric noise in 5-Mc/s band at (Phadke 1955)

PREDICTION, IONOSPHERIC (see also MUF, LUF)

Using observations at ionosphere stations to estimate current values of ionospheric characteristics at other locations (Zacharisen 1963)

PULSES (see also ECHOES)

Observations at Calcutta of (Baral 1952)
Measurements of ionosphere, a modified Hammarlund Super-Pro communica-
tion receiver for (Mitra, S. N., 1951)
Study of, Long-range pulse-propagation experiment on 20.1 Mc/s (Silberstein 1958)
RADIO NOISE (see also ATMOSPHERIC NOISE)

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Revised data (Kelley 1960)
Indices of solar activity based on (Minnis 1959)
Ionospheric wave propagation and (Saha, M. N., 1938)
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RADIO-STAR OBSERVATIONS

Measurement of ionospheric drift by (Dueño 1961)
Diffraction of radio waves from, passing through a phase-changing ionosphere (Hewish 1951)
In radio-astronomy in the tropics (Huntley 1953)
Scintillation of, at an equatorial station (Koster 1958)
Scintillations of, and magnetic activity in Ghana (Koster 1961)
Scintillation of, and movements in ionosphere (Lepechinsky 1955)

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Of ionosphere over Calcutta (Baral 1950)
Estimated from growth of F2 layer (Berkner 1940)
Of F2 deduced from luni-solar variations (Brown 1956)
And electron annihilation in F2 layer (Burkard 1950)
In the lower ionosphere, theoretical and experimental study of (Mitra, A. P., 1954)
Associated with nighttime E-layer critical frequency (Piggott 1955)
In F2 region, from study of solar eclipse (Van Zandt 1960)

REFLECTION

Microscopic equations of ionospheric (Bose 1938)
REFRACTION

Effect of transverse magnetic field on (Bannerjee, S. S., 1939)
Index of, and absorption index of ionosphere (Murty, Y.S.N., 1963)
Experimental study of, in propagation of 10-centimeter waves over short non-optical sea path (Stack-Forsyth 1955)

REGULARITIES (see also ANOMALIES; IRREGULARITIES; FIELD-ALIGNED IRREGULARITIES)

In ionosphere (Appleton 1956)
Of the ionospheric F region (Chatterjee 1953, 1954)
In F2 region (Ratcliffe 1951)
In F2 layer at Ibadan (Skinner 1954)

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Geomagnetic disturbance, Van Allen belt, and (Akasofu 1961)
Magnetic field of, equatorial (Ben'Kova 1962)
Statement of agreement regarding (Hines 1960)
Effect of, on terminal shape of geomagnetic field (Spreiter 1967)
Solar flare effects on (Veldkamp 1954)

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Of ionospheric currents near the equator (Cahill 1958)
Of transient fine structure of E layer (Diestinger 1959)
Of daytime electron density to 620 km using Doppler technique over Wallops Island (Jackson 1961)
Evidence for ionospheric currents near geomagnetic equator, from (Maple 1951)
Of electron density in F region (Nisbet 1960)
Evidence of ionospheric currents from, near magnetic equator (Singer 1951)
In exploration of magnetic fields and electric currents in upper atmosphere (Singer 1954)
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Stratospheric air studies at (Belmont 1962)

SATELLITE (see also FARADAY EFFECT)

Faraday determination of electron density using (Blackband 1960)
Studies of the equatorial ionosphere by (Blumle 1961)
Observations of electron content by (Blumle 1962)
Observations of the equatorial ionosphere by (Blumle 1962)
Topside spread F from (Calvert 1963)
Faraday determination of electron density using (Garriott 1960)
Measurements of the South Atlantic magnetic anomaly by (Heckman 1962)
High-frequency fading of 108-Mc/s wave from, as observed at an equatorial station (Kent 1961)
Ionospheric electron content calculated from a hybrid Faraday-Doppler technique using (Mendonca 1962)
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Evidence for a further ionospheric ledge above the F2 region from, ARIEL data (Sayers 1962)
Ground stations, IGY vector field proton magnetometer for (Shapiro 1960)
Scintillation of radio transmissions from, due to field-aligned irregularities (Singleton 1961)
Scintillation of radio transmissions from, Explorer VII (Singleton 1962)
Ionospheric disturbances associated with, Echo I (Tiuri 1963)
Ionospheric electron content and its variation deduced from (Yeh 1961)

SCATTERING

Increase of, in F layer at sunset (Appleton 1960)
Fading of waves weakly scattered at vertical incidence (Awe 1961)
Long distance (Banerjee, S. S., 1951)
Of radio waves, and horizontal gradient of ionization (Banerjee, S. S., 1953)
Of short-wave radio signals (Banerjee, S. S., 1953)
From F-layer in the Far East during IGY (Bateman 1959)
To explain decrease in cosmic noise on disturbed days (Bhonsle 1960)
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Of radio waves, by the F region (Booker 1938)
In VHF research program at NBS, during IGY (Bowles 1957)
Phenomena of, in equatorial ionosphere (Bowles 1960)
Radar observations of new forms of, in ionosphere (Bowles 1962)
From sporadic E, near the magnetic equator (Bowles 1962)
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VHF ionospheric, near magnetic equator during IGY (Cohen 1963)
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Transsequatorial, scintillation and spread F (Koster 1960)
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SID effect on VHF propagation via (Obayashi 1960)
NeW type, observed by shipborne ionospheric sounder over sea
(Okamoto 1957)
In F-region, and sporadic E peculiarities in Far East ionosphere
(Smith 1960)
At Huancayo, in relation to radio star scintillation (Wells 1954)

SCINTILLATIONS (see also RADIO STAR OBSERVATIONS; IRREGULARITIES; and
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And latitude distribution of ionospheric irregularities (Singleton
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Of radio stars, in relation to F scatter at Huancayo (Wells 1954)
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Sunset fading effects at (Bennington 1960)
Twenty-seven-day variations in absorption of D region of (Lange-Hesse 1953)
Ionospheric changes at, during solar eclipse 20 June 1955 (Minnis 1957)
Ionospheric changes at, during solar eclipse 14 December 1955 (Minnis 1959)
Ionospheric behavior in F2 region at (Osborne, B. W., 1951)
Lunar variation in critical frequency at (Osborne, B. W., 1952)
Electron content of F2 layer above (Osborne, B. W., 1953)
Horizontal movements of ionization in F region at (Osborne, B. W., 1955)
Fading on 9.69-Mc/s BBC station at, received in California (Yeh 1958)

SKYWAVE (see also FIELD STRENGTH)
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Calculation for, median field strength (Piggott 1959)

SLANT SPOR. DIC E (see SPORADIC E)

SLOUGH, ENGLAND

Spread F over (Briggs 1958)
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Twenty-seven-day variation in absorption of region of the ionosphere over (Lange-Hesse 1953)
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SOLAR ACTIVITY (see also SOLAR FLARE)

Variation of, ultra-violet, as revealed by ionospheric and geomagnetic observations (Allen 1946)
F_o F2 related to indices of (Bazzard 1961)
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Terrestrial magnetic and ionospheric effects associated with bright chromospherlc eruptions (McNish, 1937)

Ionospheric changes associated with event of 23 February 1956 (Minnis 1956)

And some indices based on ionospheric and radio noise measurements (Minnis 1959)

$E_s$ occurrence in relation to (Mitra, R. K., 1963)

Effect of enhanced, on $F_2$ region at Waltair (Rao, B. R., 1958)

$MUF$ factor and (Rao, C.S.R., 1960)

Variation of critical frequencies with (Rastogi 1957)

Geomagnetic influence on $F_1$ and $F_2$ regions and (Rastogi 1959)

Altitude of tropopause near equator and (Stranz 1959)

SOLAR ECLIPSE

Ionospheric observations on $F$ regions during, of April 19, 1953 (Datta, S., 1959)

Effects of, on 25 February 1952 (Estrabaud 1952, 1953)

Behavior of $F_2$ region during (Gliddon 1962)

Effects on ionosphere at Huancayo during, of 25 January 1944 (Ledig 1946)

$F_2$ region ionosphere soundings in equatorial Africa during, of 25 February 1952 (Lejay 1956)

Of 25 February 1952, ionospheric behavior at Khartoum during (Minnis 1955)

Of 20 June 1955, ionospheric changes in Singapore during (Minnis 1957)

Of 14 December 1955, ionospheric changes at Singapore during (Minnis 1959)

Of 14 February 1954, measurements of ionospheric heights and radio observations in South Sea Islands during (Minohara 1934)

Partial, of 2 February 1952, and its effect on ionosphere (Mitra, S. N., 1953)

SOLAR ECLIPSE (Continued)

Propagation of radio waves reflected from the ionosphere during
(Rastogi 1960)

Of February 1962, observations of ionosphere in New Guinea
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In study of short-period variations in the ionosphere using
instantaneous frequency measurements (Chan 1962)

On trans-Sahara path, studied by Doppler technique (Davies 1962)

And changes in electron density over Ahmedabad (Degaonkar 1961)

Equatorial electrojet in Peru related to (Forbush 1950, 1961)

Effects, on 2.5- and 5.0-Mc/s atmospheric radio noise (Herman 1961)

Effects, in F region (Knecht 1962)

Of 23 February 1956, ionospheric changes observed at Singapore,
Inverness, and Slough (Minnis 1956)

Type variation of, and the conductivity of the ionosphere (Nagata
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And SID effect on VHF scatter propagation (Obayashi 1960)

On the location of the ionospheric current system causing geomagnetic
solar flare effect (Rao, K.S.R., 1963)

Of 23 February 1956, and associated ionospheric effects at Ahmedabad
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And study of S.E.A. at Delhi (Sachdev 1958)

Effects on equatorial electrojet (Veldkamp 1954, 1960)

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SPLITTING (see also GYROFREQUENCY)

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And measurement of gyrofrequency at F region heights above Hobart, Tasmania (Ellis 1957)
Magneto-ionic triple splitting over Delhi (Mitra, S. N., 1955)
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SPORADIC E (see also ELECTROJET)

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And dependence of $f_0E_3$ on ionosonde system gain--$E_d$, $E_{sq}$ (Kerblai 1960)
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Scatter, and F layer scatter, observation of at VHF—$E_s$ type M (Miya 1961)
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Overhead non-blanketing, theory of—$E_{sq}$ (Renau 1961)
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Equatorial, negligible effect on cosmic noise absorption on 25 Mc/s (Shirke 1962)
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SPREAD F (see also ECHOES; FLUTTER FADING; IRREGULARITIES; SCINTILLATION)

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Effect on VLF (Rieker 1963)

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Instability of equatorial F layer after (Calvert 1963)

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Relationship between magnetic activity and $F$-layer critical frequency and (Bergh 1961, 1962)
Lack of correlation of non-seasonal component of noon $f_oF_2$ with (Berkner 1938)
Widening of anomalous equatorial belt during maximum of (Bhargava 1961)
Fluctuation of $F_2$ ionization and (Bibl 1963)
Inverse variation of spread $F$ with (Bowman 1960)
Observations of spread $F$ over (Briggs 1964)
Ionospheric $F_2$ layer of Ahmedabad, Delhi, and Tiruchirappalli during minimum of (Kotadia 1956)
$F$-region anomaly in the African, American, and East Asian equatorial sectors during maximum of (Lyon 1963)
Influences on spread $F$ at Baguio (Marsigan 1960)
Study of geomagnetic anomaly during maximum of (Rao, C.S.R., 1962)

SUPER-REFRACTION (see also REFRACTION)

Atmospheric and anomalous propagation of radio waves off the coast of Natal (Phillips, W. E., 1951)

SYMPOSIA (see also BIBLIOGRAPHY)

Proc. Israel 5th Annual Conference on Aviation and Astronautics (Altman 1963)
International symposium on equatorial aeronomy—introduction (Cohen 1963), (agenda on page 227)
Report of committee to promote observations of daily variation of horizontal magnetic force between and near the equators (Egedal 1951)
Exosphere and upper $F$ region (Hines 1960)
Dynamic characteristics of ionosphere (Johnson, M. H., 1950, Martyn 1950, McNish 1950)
SYMPOSIA (Continued)

Conference on ionospheric physics (Pennsylvania State College 1950)
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International symposium on fluid mechanics in the ionosphere (1959),
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TALARA, PERU

Anomaly in total electron content over (Altman 1963)
Electron density at, during solar maximum (Schmerling 1958, 1959, 1960, 1961)
Electron density and true-height variations at, during IGY quiet days (Somayajulu 1963)

TAMANRASSET, ALGERIA

Airglow studies at (Barbier 1959, 1961)

THUNDERSTORM (see also ATMOSPHERIC NOISE; LIGHTNING)

Relationship to E_s not supported (Berkner 1937)
Relationship to E_s apparent (Bhar 1959)
Days of, on land mass of India (Chandrashekhar Aiya 1954)
Noise power radiated by, tropical (Chandrashekhar Aiya 1955)
Tropical, as noise radiators (Chandrashekhar Aiya 1955)
Noise from, in standard broadcast band (Chandrashekhar Aiya 1956)
HF noise from, in tropics (Chandrashekhar Aiya 1960)
In Spring, over Bangalore (Chandrashekhar Aiya 1963)

TILT (see also HORIZONTAL GRADIENTS)

Polarimeter for study of (Benner 1950)
Comparative directional measurements of (Bramley 1955)
Equatorial (Somayajulu 1963)
Observed with backscatter on transequatorial paths (Thomas 1962)
Anomalous transequatorial propagation caused by--ionospheric height and frequency plots (Thomas 1962)
Revealed by anomalous transequatorial ionosphere (Villard 1957)
Effective, of the ionosphere at places 1000 kilometers apart (Whale 1955, 1956)
Resulting modes of HF propagation and (Yeh 1960)

TIRUPATI, INDIA

Studies on sporadic E at (Venkateswarlu 1961)
TIRUCHIRAPALLI, INDIA

Ionospheric F2 layer during sunspot minimum (Kotadia 1956)

TOPSIDE SOUNDING

Studies of spread F using (Calvert 1963)
Of the ionosphere (Knecht 1962)
Low-latitude field-aligned ionization observed by, Alouette satellite (Lockwood 1963)
Propagation along field-aligned sheets of ionization observed by, Alouette (Muldrew 1963)

TOWNSVILLE, AUSTRALIA

Anomalous transequatorial VHF propagation recorded at (Carman 1963)

TRANSEQUATORIAL

Virginia to Ghana on 17.5 Mc/s (Agy 1962)
Prediction of MUF over paths (Allcock 1956)
Study of scatter mode (ARRL 1959)
Anomalous VHF propagation (Carman 1963)
Reception of VLF (Chilton 1964)
Propagation of VHF signals (Cracknell 1959, 1960)
Enhanced propagation following geomagnetic storms (Ferrell 1951)
Study of propagation phenomena (HRB-Singer, Inc. 1961)
Scatter, scintillation, and spread F (Koster 1960)
Nighttime scatter at 50 Mc/s (Southworth 1960)
Backscatter observations of magnetically controlled ionization at Brisbane (Thomas 1961)
Propagation, general effects (see Thomas 1961 through 1964)
Instrumentation for observation for field-aligned F-region irregularities (Thomas 1962)
Ray tracing and mode analysis (Thomas 1962)
Observations of propagation from Brisbane (Thomas 1962)
Lunar control of abnormal propagation (Thomas 1962)
Anomalous propagation, cross and auto correlation effects associated with, at 16 Mc/s (Thomas 1962)
TRANS Equatorial (Continued)

Field-aligned irregularities (Thomas 1962)
Studies of propagation by scatter sounding method (Villard 1957)
New evidence of anomalous propagation (Villard 1957)
F-layer propagation study (Washburn 1963)
New type of fading observed on HF paths (Yeh 1958)

TRANSMISSION LOSS, IONOSPHERIC

On 8500-km path between Sterling, Va. and Accra, Ghana (Agy 1962)
Penetration of thin ionospheric layers (Deb 1940)

TRAVELLING DISTURBANCE

Fluctuation of F2 ionization and (Bibl 1963)
Variations of instantaneous frequency observations of large scale TD, related to geomagnetic sudden impulses (Chan 1962)
In ionosphere (Munro 1950, 1956, 1957)
In F over Waltair (Rao, E. B., 1961)
Investigation of, by CW (Somayajulu 1953)
Detection of rapidly moving ionospheric clouds (Wells 1946)

TRIPOLI, LIBYA

HF path between Accra, Ghana and (Barghausen 1964)
Equatorial flutter fading between Accra, Ghana, and (Calvert 1962)

TRIVANDRUM, INDIA

Electron density in ionosphere over (Rao, C.S.R., 1961)
Geomagnetic activity and spread F at (Rao, C.V.S., 1962)

TROPICAL COMMUNICATION (see also JUNGLE RADIO COMMUNICATION)

Calculation of median sky-wave field strength in tropics (Piggott 1959)
Improved intercontinental communications (Rodam 1944)
TROPICAL COMMUNICATION (Continued)

Research engineering and support for tropical communications (Vincent 1963)

TRUE HEIGHT (see also VIRTUAL HEIGHT)

New calculation methods (Becker 1959)
Early morning variation of F region over Calcutta (Ghosh, S. P., 1940)
Effect of magnetic activity and F-region height change on equatorial spread F (Krishnamurthy 1963)
Equatorial spread F and F layer height (Lyon 1960)
Estimation of heaviside layers in Bengal (Rakshit 1931)
Measurements of ionospheric heights at Calcutta (Rakshit 1934)
Coefficients for rapid reduction of h'f-records to N(h) profiles without computer aids (Schmerling 1959)
Some results of IGY survey (Schmerling 1961)
By method of signal fading (Sen Gupta 1936)
Spread F and F-layer height (Singleton 1962)
Calculation of real and virtual heights (Titheridge 1959)
Ionospheric height measurement at Allahabad (Toshnival 1944)

TSUMEB, SOUTHWEST AFRICA

F-layer phenomena at (Dieminger 1960)
Reflecting properties of ionosphere between 350 and 1500 kc/s at (Elling 1960)
Sporadic E at (Umlauf 1960)
Air-to-ground propagation in band nine (Kirby 1963)
VELOCITY

Curves for radio wave propagation (Bajpai 1937)
Group velocities and group heights from magnetoionic theory (Shinn 1952)

VERTICAL INCIDENCE (see also CRITICAL FREQUENCIES, \( f_{oF2} \))

Ionospheric critical frequencies and magnetic parameters (Bergh 1961)
Ionospheric observations over Atlantic Ocean (Bukin 1961)
Studies on ionospheric tidal effect on critical frequencies at Huancayo (Burkard 1951)
Penetration of thin ionospheric layers at (Deb 1940)
Solar eclipse 25 February 1952 in equatorial Africa—effects on E region (Estrabaud 1953)
Correlation analysis of fading of radio waves reflected at (Fooks 1961)
Observations of occurrence and movement of sporadic-E ionization (Harwood 1961)
Relationship between \( f_{oF2} \) and magnetic phenomena (King 1962)

VHF PROPAGATION

NBS scatter research program (Bowles 1957)
Transmissions across the magnetic equator (Bowles 1960)
Anomalous transequatorial (Carman 1963)
Propagation curves for broadcasting in Africa (CCIR 1963)
Scatter (Cohen 1963)
Radio-wave attenuation through jungle and woods for (Krevsky 1963)
SID effect on VHF scatter associated with solar outburst 29 July 1958 (Obayashi 1960)
Sporadic E observed on oblique-incidence circuits (Smith 1958)
Nighttime equatorial scatter on 50- and 144-Mc/s—radio amateur VHF transequatorial scatter observations during IGY (Southworth 1960)
VHF transequatorial propagation via F layer (Washburn 1963)
VIRTUAL HEIGHT (see also TRUE HEIGHT)

Variation of noon values (Appleton 1950)
Rapid increase of, for F layer after sunset (Appleton 1960)
Calculation of (Titheridge 1959)
Analysis of nighttime h'(f) records (Titheridge 1961)
New method for analysis of ionospheric h'(f) records (Titheridge 1961)
Measurements in Bengal (Sen Gupta 1936)

VLF PROPAGATION

Measurements for the Radux-Omega navigation system (Casselman 1959)
Transequatorial reception of (Chilton 1964)
Mode theory of, in presence of transverse magnetic field (Crombie 1960)
Reflection from a sharply bounded ionosphere for propagation perpendicular to the magnetic meridian (Crombie 1961)
Nonreciprocity along magnetic equator (Crombie 1963)
Attempt to observe whistlers near magnetic equator (Koster 1955)
Sunrise and sunset effects on (Rieker 1963)
Summary of literature pertaining to (Whitson 1962)
WALTAIR, INDIA

Polarization of $E_s$ echoes at (Abhirama Reddy 1962)
Structure of $E_s$ at, as deduced from polarization observations (Abhirama Reddy 1963)
Z echo at (Abhirama Reddy 1963)
Theoretical wave polarization at vertical incidence (Abhirama Reddy 1963)
Nocturnal and seasonal variations of spread F at (Krishnamurthy 1963)
Absorption on 5.65 Mc/s at (Ramana 1961)
Horizontal drifts in F2 region at (Rao, A. S., 1963)
Horizontal drifts in E region at (Rao, A. S., 1964)
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Diurnal variation of absorption at (Rao, B. R., 1958)
Effect of enhanced solar activity on F2 region drifts at (Rao, B. R., 1958)
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The F region over (Rao, E. B., 1961)
Long-period fading in medium radio signals at (Rao, M. S., 1955)
Influence of weather conditions on field strengths received at, by a long-distance short wave transmission (Rao, N. S. S., 1950)
Horizontal drifts in E region at (Rao, R. R., 1960)
Height gradient of horizontal drift in E region over (Rao, R. R., 1961)
Investigation of traveling disturbance by CW at (Somayajulu 1953)
WASHINGTON, D.C.

Anomaly in total electron content—summer decrease (Altman 1963)
Non-seasonal changes of F2-region ion density at (Berkner 1938)
Frequency of occurrence of F2 over (Chadwick 1962)

WATHEROO, AUSTRALIA

Small differences in monthly mean $f_{\text{F2}}$ at (Bannon 1946)
Characteristics of upper ionosphere at (Berkner 1936)
Abnormal ionization of E region at (Berkner 1937)
Non-seasonal change of $f_{\text{F2}}$ region at (Berkner 1938)
Ionospheric changes (Berkner 1940)
Systematic ionospheric changes (Berkner 1940)

WEATHER

At Macao, correlated with ionospheric height (Gherzi 1952)
The influence of weather conditions on long distance short wave transmission (Rao, N. S. S., 1950)

WINDS

Tropical upper air studies (Belmont 1962)
Some phenomena of the upper atmosphere (Chapman 1951)
In the dynamo mechanism for the magnetic diurnal variation (Forbush 1950)
Interpretation of, as drifts in F2 region (Martyn 1955)
Stratospheric, and 26 or 27-month periodicity in equatorial geomagnetic field (Stacey 1962)
Ionospheric current systems caused by, non-periodic (Van Sabben 1962)
Z ECHO (see also SPLITTING, POLARIZATION)

At Waltair (Abhirama Reddy 1963)
Attributed to partial reflection of ordinary echo
(Satyanarayana 1959)